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The book cover features a decorative border. At the top, a horizontal band contains the text "THE OPEN DOOR". Below this is a large, ornate archway. The arch is supported by two figures, possibly cherubs or personifications, on either side. The arch itself is filled with a diagonal hatching pattern. The entire design is enclosed within a rectangular frame with decorative corner elements.

THE OPEN DOOR

FOREMAN TRAINING

AND

FACTORY MANAGEMENT

L. A. HARTLEY



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FOREMAN TRAINING AND FACTORY MANAGEMENT

L. A. HARTLEY

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PREFACE

This material is prepared in answer to a demand for a short course of lessons in foreman training. Experience in attempting to concentrate a series of eighty-five lessons into an evening course during the limited time the students were able to attend, convinced the author of the need for a shorter course.

These topics, in mimeographed form, were used and continually revised during the training of seven different groups.

No claim is made for having presented new ideas. Superintendents and managers who have shared this training with their foremen have been unanimous in reporting that the changes in their factory practices resulting from this course, represent merely old and proven business principles.

Several excellent texts have been used by the author during his experience in foreman training, each of which has contributed in part, toward the preparation of this material.

Limited space does not permit mention of the names of the many foremen, superintendents and managers who have contributed useful material. Special acknowledgement is made to the following persons: Mr. John Purcell, Assistant to Vice-President, Santa Fe Railway System, for helpful suggestions on apprentice training and factory management; Mr. N. E. Hildreth, Works Manager, Witte Engine Co., Kansas City, Mo., for suggestions in the organization of instruction; Miss Alice M. Loomis, Assistant State Supervisor of Trade and Industrial Education for Women's Trades in Nebraska, for assistance in the preparation of material; Wm. DeBaufre, Professor of Mechanical Engineering, University of Nebraska, for helpful criticism of the topics.

L. A. HARTLEY.

Lincoln, Nebraska
November, 1920

INTRODUCTION

Three principal aims are undertaken in this series of topics:

- 1—Increased production
- 2—Improved cooperation
- 3—Lowered labor turnover.

It is assumed that foremen who are not interested in improving the quantity or quality of production will not manifest an interest in foreman training.

The course is planned so that the topics may be read as a book, studied as independent or related lessons, or used as a ready reference book by foremen, superintendents or managers. An endeavor has been made to use short sentences intended to provide the foreman with "production proverbs", which may be useful to him in daily conversation.

This course has been used in training foremen, foreladies, superintendents and managers representing more than thirty-five different trades or pursuits. In order to insure its general application, the examples chosen to illustrate principles have concerned common experiences.

Specific application of general principles laid down in the topics is provided in the series of related questions following each topic. These questions are intended to direct the attention of the foreman to the special problems of his own business. Further application of these general principles to individual situations may be obtained by round table discussion of resolutions based upon the subject matter of the topic.

Resolutions have been selected from among many proposed during several training courses and have been combined with a detailed outline of the methods of organization of class work in foreman training, into a book which can be obtained from the publishers of this book. This material is omitted from this publication in the interest of offering a readable book to foremen, who might be confused by the pedagogical material.

The four factors which are generally considered during the development of foremen training, i. e. materials, equipment, operations and processes, and men, have been supplemented by a fifth factor, outside influences.

Out of consideration for the persons to whom the topics will go, less space has been devoted to the materials factor than is sometimes given. If the topics were to be used with college students in pre-foreman instruction, emphasis might well have been placed upon materials. It is safe to assume that each company has a policy regarding handling and storing materials, and that, by the time a worker is ready for a foremanship, he will have become fairly familiar with the various methods of handling and storing of materials.

The concensus of opinion among managers seems to indicate clearly that the human factor is the one requiring greatest attention. In this series an endeavor has been made to follow the suggestions of successful foremen, superintendents and managers with regard to the relative values of the five factors mentioned above.

All five factors are touched upon in each topic with the exception of the first three. This arrangement is set up as a part of the plan to provide topics which can be used independently as well as in series.

This independent arrangement is a result of experience in many foreman training groups, where unavoidable absences from one of a series of interdependent lessons usually resulted in a permanent separation from the course.

In anticipation of a revised edition the author will appreciate receiving any criticism which may suggest itself to the reader.

Topic No. 1

ROUND TABLE DISCUSSION

Round table discussion offers opportunity for instruction in recitation. This type of socialized recitation is coming to be recognized as having advantages peculiarly adapted to industrial training. Its successful operation depends upon the application of the methods of organization, and the principles of discussion.

METHODS OF ORGANIZATION

The round table should begin its organization by the selection of a chairman, vice-chairman and secretary.

The duty of the chairman is to preside over all sessions of the round table and to render decisions in case of an equal division of opinion of the members. The vice-chairman will be expected to assume the duties of the chairman during the absence of the chairman. The secretary is expected to make a record of important questions and of decisions following discussions.

A committee composed of the chairman, vice-chairman and secretary, should be formed with whom the instructor may confer from time to time regarding the conduct of the course and the selection of questions for discussion.

Questions for discussion should be announced in advance, and persons selected to present the questions before the round table. Strict observance of time allowance for each speaker will be necessary in order that the period may be finished on time. The chairman should be held responsible for time observance.

The instructor should open the discussion with a statement of the principles involved in the question to be brought before the group. Notes taken during this statement of principles may serve as a guide during discussions.

Following the debate between selected persons, considerable time should be devoted to general consideration of the question, each member of the round table taking part in the discussion.

At the close of the general discussion, the instructor should present a summary of conclusions. When the summary is finished, the following announcements should be made:

- 1—Resolution to be discussed during the next session.
- 2—Names of persons selected to lead in the discussion.

PURPOSE OF INSTRUCTION AND PRACTICE IN DISCUSSION

Churches, schools and the press are usually the cultural reflection of our best businesses. In many instances, however, our businesses would reflect their better selves more truly if the reflection came from within rather than from without. Every business should be represented in the community by workers who not only understand the business but can go before the public on a moment's notice and defend this or that company policy, or ably advocate some plan for community betterment. If the foremen and superintendents were trained in the art of expressing their honest opinions, the demagogue and the political shyster would soon be forced to change to essential occupations.

This course is intended to aid in the preparation of a group of trained industrial leaders who will take their places before the people and help to bring about an understanding of the problems and opportunities of the business enterprises of the community.

PRINCIPLES OF DISCUSSION

During discussion, the speaker should consider himself to be a *salesman of ideas*. He will have arrived at certain conclusions and he will be expecting to convince his hearers of the validity of his claims. The first duty of the salesman is to believe in the goods he is to sell. In that connection, the question for discussion should be so worded that each side will have reason for the faith it is sustaining. It becomes the duty of the speaker, as a salesman of ideas, to present them in as attractive and winning a manner as possible.

It is not to be wondered at, that some speakers create antagonism for the ideas they present. The idea may be a perfectly good one

but if it is presented in a belligerent or antagonistic manner, the effect is to antagonize the group to whom it is presented. Under the circumstances, the speaker is disappointed in the result. A little reflection will convince any right minded person that "The public should not be blamed for refusing to accept an article from a poor salesman." If a speaker will but consider himself a salesman of ideas, he will have gone a long way toward becoming a finished public speaker. All conversation is but a vehicle by which ideas may be transported.

Order, that first law of life, should appear in conversation as well as in all other means of expression. Order in conversation depends upon the method of organization. There are three natural steps in conversation—for convenience, we shall name them, comparison, presentation and demonstration.*

In the comparative step, the minds of the audience (customers) are prepared to receive the idea which is about to be presented. In the presentation step, the idea is joined up to the knowledge which the customer already possesses. In the comparative step, the speaker will do well to consider the minds of his audience as so many grab-bags containing any number of ideas, some wholly unlike the new idea to be presented, others quite similar to it. The speaker should select some common idea, which he has reason to believe may be found in the minds of his hearers, and which is as nearly similar as possible to the new idea to be presented. The common idea should compare with or parallel the new idea to be presented.

Example—A talk intended to show the advantages of using overhead conveyers, rather than trucks and wheelbarrows, for delivery of materials. Notes: 1—It is assumed that the audience is made up of persons who are familiar with the overhead delivery systems in use in department stores. 2—The introductory statement should call attention to the need for improvement of the present system of delivery.

*Note: Step 1 may be preceded by an introductory statement or question which will direct the attention of the customer or audience to the subject to be discussed.

Comparison

STEP 1—The common idea, i. e., the department store delivery system, having been selected, the audience may be reminded of their experience in department stores where packages are delivered quickly and surely to any department. Attention may be called to the great saving in time and energy through the use of a delivery system.

Presentation

STEP 2—The comparison being complete the “salesman” may proceed directly to a description of the shop conveyor showing the essential differences between it and the department store conveyor emphasizing its strong points.

Demonstration

STEP 3—Having presented the new idea the salesman may clinch his argument by showing how easily and effectively the conveyor may be applied to the shop.

A little practice in the selection and use of comparisons will enable the speaker to prepare readily the minds of his hearers for the presentation of his ideas.

METHODS TO BE USED DURING PRESENTATION

Among the tools of a carpenter will be found a saw, hammer, plane and square. Certain tools are used in conveying ideas by means of conversation or discussion. The speaker or teacher has four tools or methods which he uses while presenting ideas. These methods are:

- 1—Experiment
- 2—Demonstration
- 3—Lecture or statement
- 4—Illustration.

Experiment is used only in an emergency and when all other methods are certain to fail.

Demonstration should be used only in connection with illustration or lecture. It should never be used except when the demonstration may be completed.

The lecture method should be used only when illustration cannot be used to advantage, and during the presentation of empirical information, such as numbers, names, locations, directions, etc. In this presentation of empirical information, which consists of arbitrary facts which will not admit of discussion, and therefore must be memorized, it is assumed that the lecture method is as good as any and is recommended in the interest of time economy.

Illustration is by far the most effective method to be used by the speaker in presenting new ideas. The three step plan for the "sale" of new ideas herein presented is designed to be especially effective when the illustration method is used.

Various combinations of methods may be used according to the requirements of the case in hand.

While the plan and the methods to be used in presentation have been offered as a means to aid persons in becoming effective in conversation and discussion, it is in order to remind the foreman that the same plan will be found effective and the same methods applicable during instruction of workers and apprentices. The same general rules apply in all cases and are as follows:

1—Preparation of the mind of the customer or student to receive the new ideas to be presented.

2—Effective presentation of the complete idea, together with related empirical information, during which the hearer or student is led to do his own thinking on the question.

3—Application of the new idea to the job or a demonstration of the new idea by the student through performance of the operation or process.

TOPICAL QUESTIONS

1—State three common errors of chairmen of meetings.

2—Write a one-hundred word account of how a chairman should proceed to obtain "strict observance of time allowance."

3—In case a member of the group goes beyond the allotted time, how would you, as chairman, go about it to cause him to yield the floor?

- 4—Give one instance of “reflection of business from within, from without.”
- 5—Can the foreman hope to succeed in a business in which he does not believe? Why?
- 6—What is the relation between the salesman about whom it is said, “The first duty of the salesman is to believe in the goods he is to sell,” and the foreman?
- 7—Give an instance of a speech which may be delivered in a belligerent or antagonistic manner.
- 8—Give an instance wherein a speech may not be delivered in a belligerent or antagonistic manner.
- 9—Select three ideas and write a letter selling them to the group.
- 10—Give an instance wherein is illustrated the fact that “Order in conversation depends upon the method of organization.”
- 11—Select any idea and present it, using the three step plan.
- 12—Give an instance of the use of experiment in presentation, demonstration, lecture or statement, illustration.
- 13—Give an instance in which more than one method may be used in presentation.
- 14—Describe the teaching of a simple operation in your trade or pursuit.
- 15—Make up a list of ten production proverbs taken from this topic.

NOTE: By a production proverb is meant a statement expressing a truth having a vital application to business. Examples: “Churches, schools and the press are usually the cultural reflection of our best businesses.” “Order, that first law of life, should appear in conversation as well as in all other means of expression.”

Topic No. 2

OCCUPATIONAL ANALYSIS

PROCESSES AND OPERATIONS, AND WORKERS

Occupational analysis consists of dividing and listing the tasks usually assigned to one or more persons engaged in one particular occupation. The list should be prepared under two general divisions: Processes and operations, and workers. Inasmuch as processes and operations are encountered only through the agency of workers, the employee should receive first consideration in analysis.

Each employee who acts independently of other workers should be given a number and that number entered upon a separate page in a note book.

Workers who are engaged in operations and processes, or in handling materials or combinations of materials, unlike those processes and materials encountered by other workers, should be listed under the caption *Special workers*.

In case the worker does not act independently of other employees, he should be given a number and that number together with those of his associates should be entered on the same page. An instance of such associated entry would be a number to represent a gang engaged in unloading coal from a car. For convenience, such a group may be listed on one page as a *common crew*, and given the common number referred to above.

The special worker in one plant may be known as a general workman. In that case he may perform many different operations in different processes and use many kinds of materials.

In another plant which is highly specialized the worker may be employed to perform certain important independent operations. In the latter case he would be a specialist within the common understanding of the term as well as within the meaning of this topic.

The test of a special worker is whether he is regularly engaged in operations or processes or in handling of materials distinctly

unlike those operations or processes or materials regularly encountered by other workers.

Foremen should be careful to avoid extreme analysis. The chemist who uses a microscope in the laboratory would be considered ridiculous if he should use a microscope to examine each brick while building a garage.

An example of extreme analysis would be listing drill press operators as special workers, merely because the various operators drill holes varying slightly in size in metals whose treatment during drilling requires slightly different knowledge.

The extent to which the analysis should be carried will depend to a great extent upon the *importance* of the operations or processes or materials with which the special worker is engaged.

If the operation is of enough importance to be considered subject matter for the instruction of workers and apprentices, it should be considered important enough to list separately in the analysis.

For ordinary purposes it will be found convenient to place operations or processes or materials which have many things in common, together in one group and designate workers who engage in such common jobs as a common crew.

Another mistake in classification would be that of placing jobs of very different characteristics together and considering those persons engaged in doing them to be a common crew. In many cases common jobs and independent jobs are easy to classify. In other cases foremen will have more difficulty in classification. In such cases foremen will need to exercise judgment resulting from experience in training workers and apprentices.

Several pages in a five by seven inch note book should be set aside for analyses of the jobs of each *special worker*, and each *common crew*.

Under the respective headings (common crew and special worker) should be listed all processes or operations in the order of accomplishment. Each process or operation should be given a number.

EXAMPLE No. 1

Common Crew No. 1

Numbers of associated workers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Operation 1—Unloading coal

2—Unloading sand.

EXAMPLE No. 2

Special Worker No. 1

Operation 1—Drilling hole in C. I. cylinder head

2—Drilling holes in steel band.

TOPICAL QUESTIONS

- 1—What kind of worker would a carpenter be who does flooring, framing, siding, roofing and finishing? Why?
- 2—List all the special workers in your department. Give your reasons for considering them special workers.
- 3—Which of the following are special workers, and which are common crews: a—Five dock laborers,—1 trucking boxes, 4 trucking barrels? b—Five dock laborers,—3 trucking boxes, 1 operating a windlass, 1 hooking and unhooking boxes to and from the windlass rope? c—Five dock laborers,—4 transferring salt from a steamer, 1 engaged in transferring dynamite from the boat to the dock?
- 4—Which kind of worker is required to have the greater intelligence, a special worker or a member of a common crew?
- 5—If three inexperienced young men, of equal desirability in other lines, one having left school in the fifth grade, one during the eighth grade and one a high school graduate, should apply for jobs in your plant, which of the three would you assign to a special job? A common job?
- 6—A machine shop has a department employing three men grinding castings, five men operating drill presses, drilling holes varying but slightly in size in materials requiring very little difference in treatment such as maleable iron, cast iron, wrought iron, etc., and one drill press operator drilling similar sized holes in similar materials, the holes in the latter case being required to

be drilled much more accurately than those by the other five operators; indicate the common crews and the special workers.

- 7—In the process of printing a hand bill, some of the following operations may be encountered: 1, starting the press; 2, inking the type; 3, cutting paper to size; 4, setting the type; 5, taking the paper off the press; 6, reading the proof; 7, placing the paper on the press. Arrange the operations in the order of accomplishment.
- 8—In the making of brick, there are several processes each made up of many operations. Some processes in brick making are as follows: 1—baking the brick; 2—digging the shale; 3—hauling the shale to the mixing sheds; 4—forming the brick. Arrange the processes in their order of accomplishment.
- 9—Give one instance of an analysis of a job in your department which would be considered an extreme analysis.
- 10—Give an instance of an analysis which at first would appear to be extreme, and which later might prove valuable.
- 11—Give an instance of how you could make use of an analysis in instruction of workers and apprentices in your department.

Topic No. 3

INSTRUCTION OF WORKERS AND APPRENTICES

The tendency in modern industry is toward the establishment of training departments, separate from production activities. In such departments, production is generally considered a by-product of instruction.

Three types of instruction prevail in industrial training:

- 1—Trade preparatory
- 2—Trade extension
- 3—Related instruction.

Trade preparatory classes are generally termed vestibule classes. This term is used to indicate that the training is carried on outside the industry, while a vital connection is maintained between training and industry. The student is expected to pass *through* the vestibule before entering the industry. Trade preparatory classes are not intended to become trade schools, where persons are taught complete trades. Vestibule classes are intended to prepare persons for advantageous entrance upon a trade or pursuit.

The foreman is not interested in the operation of the vestibule class, his sole interest in trade preparatory training being in the character of the workers assigned to his department from such a class. In this regard he can promote the welfare of his own department by close cooperation with the training department in suggestions regarding requirements, limitations, etc.

Trade extension classes are organized to give additional instruction and training in occupational practice. Four kinds of jobs are recognized in modern industry. They are as follows:

- 1—Service
- 2—Production
- 3—Technical
- 4—Professional.

Service jobs are those jobs which, while not actually resulting in production, do render production easier or cheaper by the supply and delivery of materials or by the preparation of auxiliary equipment. Service jobs are generally performed by unskilled or semi-skilled labor. Some service jobs are loading and unloading of raw and finished materials, erecting of stagings, etc.

Production jobs are those jobs which actually result in the changing of materials either in shape, form or nature of content. Production jobs are generally performed by skilled labor.

Technical jobs are jobs which, while not actually resulting in production, do render production easier or cheaper by supplying data, preparing tools or equipment and preparing materials for production. Some technical jobs are drawing, laying out, tool-making and designing. Technical jobs always require some knowledge of related science, drawing, mathematics or English, in addition to a working knowledge of production operations.

Professional occupations in industry are occupations related to production, requiring a thorough knowledge of the application of related science, mathematics, drawing and English. Entrance qualification for a professional occupation is college training or its equivalent. Some professional occupations are mechanical, civil, electrical and chemical engineering.

One of the principal causes of industrial unrest is the blind alley job. Every normal person is ambitious. He wants to succeed. He wants to grow. Wages alone will not satisfy. Conditions can not be offered which will bring permanent contentment. An avenue must be opened in every business whereby advancement is possible. The natural avenue of development and promotion in industry is from service to production, from production to technical and from technical to professional occupations.

A modification of Richard's formula reads $M + TK + AK = E$. Manipulation plus Technical Knowledge plus Auxiliary Knowledge equals Efficiency. Manipulations are the *doing* things. Technical Knowledge is that knowledge which is absolutely necessary to manipulation. Auxiliary knowledge is that knowledge which, while

not being absolutely necessary to manipulation, does render manipulation easier, cheaper or more interesting. Service, production and technical jobs will be found to require technical knowledge to the extent that they require manipulation. Skill in production is a result of technical knowledge. Professional occupations will require a greater amount of auxiliary knowledge. The college graduate who has the AK will remain ordinary until he obtains, through experience, a knowledge of manipulation. Likewise the worker who has the M plus TK, will remain ordinary until he adds to skill, the auxiliary knowledge which will make it easier and cheaper for him to manipulate.

Foremen have always been held responsible for the training of workers in production and there are reasons to believe that such will always be the case.

Assuming that the foreman will be expected to train workmen, it is only fair to offer a few suggestions with reference to the art of teaching.

Included in the technical and auxiliary knowledge which the foreman will present, will be found certain empirical information which may not be reasoned upon. It will not admit of discussion. Such information must be memorized. Empirical information will be found to consist of names, numbers, locations, and directions. When the things which may be reasoned upon have been separated from the things which must be told or shown, an analysis of the teaching content of the occupation has been begun. Such analysis will be found to follow the factors of the modified Richard's formula.

The foreman who desires to function efficiently, as an industrial instructor, will analyze each job in the following order:

- Manipulations
- Technical knowledge
- Auxiliary knowledge
- Empirical information.

In teaching the occupational lessons the same rules should be observed as were presented under Principles of Discussion, Topic No. 1.

TOPICAL QUESTIONS

1—Which of the following students are trade preparatory students? Trade extension? Students of related instruction? a—A machinist who is preparing himself to increase his usefulness in his trade by studying mathematics in evening school. b—A machinist who plans to extend his usefulness by attending an evening class in sheet metal work. c—A machinist whose daily work relates to the repair of printer's machinery, who studies in evening classes, the latest practices of his trade.

2—Let PF = Professional Job
 P = Production Job
 T = Technical Job
 S = Service Job
 B. A. E. = Blind Alley Exit.

Arrange the above formula in the order of the progress of a worker.

3—Select a simple job in your trade and record the manipulations, the technical knowledge, the auxiliary knowledge, and the empirical information relating to the job.

4—Indicate the M, TK, AK, and the empirical information of the following:

A carpenter is assigned to the job of marking a board to be sawed. In order to mark the board he has to know where to mark, what to mark with, how to mark, etc. He must measure, apply a lining instrument, mark, etc. He may know that the wood is soft or hard, and that some pencils may stain the wood etc. He should know the names of tools, such as pencil, scriber, marking gage, bevel gage, tri-square, etc.

5—List the jobs in your department recording M, TK, AK, and empirical information as follows:

NAME OF JOB

M	TK	AK	Empirical inform.

6—Select a simple job and write a detailed account of how you would teach the job to a “green” worker.

Topic No. 4

MAINTENANCE OF ORDER

DISCIPLINE, ORDERS, DIRECTIONS AND SUGGESTIONS

Maintenance of order is a recognized necessity in any enterprise. Order is the first law of growth. Discipline is necessary if order is to be maintained. There is a difference, however, between maintenance of discipline and the enforcement of discipline. Discipline should be self-enforced, rather than enforced by a foreman. If the foreman is a person who is orderly in his habits, personal and otherwise, he will have laid the foundation for effective maintenance of discipline in his department. That discipline, which is the result of continual reproof, is always maintained at the expense of the patience and the energy of the foreman which could be used to better advantage in other ways. Few persons are incapable of self-discipline. Most persons prefer order to disorder. The foreman will do well to reflect upon this fact when directing the workers under his charge. It may be safely assumed that ninety-nine cases of disorderliness out of one hundred are directly traceable to poor foremanizing rather than to neglect on the part of the worker. *Some common errors conducive to disorderliness are as follows:*

- 1—Failure to treat every one alike
- 2—Belligerent attitude
- 3—Familiarity
- 4—Assumption of personal policy
- 5—Failure to understand the relative values of orders, directions and suggestions
- 6—Lack of technical and auxiliary knowledge, on the part of the foreman, of the processes or operations he is supervising.

Failure to accord every one in the department the same consideration, will certainly result in the formation of cliques and in misunderstandings. Success for the foreman depends upon team work. Rivalry in striving toward a common aim is sometimes

helpful but it must be good natured. The foreman who seeks to establish such rivalry by means of special attention to individuals, is inviting certain failure. If a pleasant greeting is spoken to one person it should be so worded, that, when repeated, it will apply equally as well to each person in the department. "*Playing favorites*" is the most certain means of destroying that team work upon which modern industry is dependent.

Some foremen adopt a belligerent attitude toward their workers, in order to impress them with their superiority. Such conduct is a survival of the ancient period in industrial development when fear was the chief interest factor.

Foreman belligerency was in vogue before significance was attached to labor turnover. Foremen who resort to this practice, assume that their workers must be driven and eventually find that the driving becomes more and more difficult. Foremen would do well to adapt the famous remark of Abraham Lincoln to their own jobs: "You can drive some of the people all of the time, all of the people some of the time, but you can not drive all of the people all of the time." The better way is not to try to fool or drive any of them, any of the time. The peculiar result of belligerency on the part of a foreman is that it always results in the foreman becoming ridiculous before his workers. This is because the situation is wholly unnatural and uncalled for. Such an attitude might be justified on the part of the skipper of a vessel, whose crew has been "shanghaied" and impressed into service. Such situations generally originate in the fertile brains of writers of cheap novels and movie scenarios. Any attempt on the part of a foreman to imitate such dime novel creations of fancy can not fail to result in ridicule of the would-be skippers.

Familiarity is the opposite of belligerency. To become familiar is to invite discussion by the workers, reveal weaknesses of supervisors and leave nothing to the imagination. It is human to err. Foremen are human. Many a man has enjoyed a reputation for strength, because he has stuck strictly to business and kept his weaknesses to himself. Discussion is a most effective method of

revealing weaknesses. If the foreman would avoid being held in contempt by his workers he must avoid familiarity. Curiosity is one of the strongest human characteristics. It is natural to desire knowledge of the lives and thoughts of those whom we meet. If we wish to maintain that interest, we should leave as much for the imagination as possible. We may rest assured that as soon as we fail to stimulate the curiosity of our associates we shall henceforth be compelled to fight for recognition. Familiarity indicates a want of poise—and without poise the foreman will be unable to command respect.

Assumption of policy authority by foremen generally results in personal animosities. Workers sometimes object to policies inaugurated by the company for which they work. While such objection may result in serious disturbance, it seldom is the cause of personal animosities. There are few workers who will show personal resentment toward a foreman for his enforcement of a company policy even though that policy should be considered objectionable. The foreman will seldom be blamed but will often find himself in the fortunate situation of peacemaker. Many serious situations have been improved and much industrial unrest averted by the presence of a foreman who has the confidence and respect of the workers and of the management. Such a situation is made worse if the foreman establishes a reputation for inaugurating and enforcing policies of his own. The assumption of personal policy by the foreman is always obnoxious to the workers and will eventually result in open warfare and increased labor turnover. If a foreman desires a policy installed, he will find it desirable to discuss it with the management and place it before the workers as a company policy.

When a worker assumes, for the first time, the duties of foremanship, he must learn to use a set of tools different from those with which he has formerly been accustomed to perform his daily work. A carpenter who uses a saw, hammer and plane, will require new tools when he assumes a foremanship. *The tools of the foreman are orders, directions and suggestions*, and with these three tools he performs all the work to which he is assigned. The mechanic who uses a wrench

for a hammer, is not merely guilty of misuse of tools, but is setting a bad example to others. There is a time to order, a time to direct, and a time to suggest. To misuse these foreman tools, is to waste time, set a bad example and appear ridiculous. The belligerent foreman always orders. The familiar foreman always suggests. Whatever directing either does is weakened by his attitude. In giving orders, directions or suggestions, the following points should be borne in mind:

What is it about?

To whom is it delivered?

Whom does it concern?

Where is it given?

Orders are essentially of military character and do not admit of discussion. To qualify an order, always weakens it. An order may be given to highly intelligent workers or to persons of low mentality.

A **suggestion** always admits of discussion and is therefore given only to persons of intelligence. If there is but one way to do a thing, the thing should be ordered done that way. If there are several ways to do a thing, and the worker is intelligent and can be trusted to choose between methods, the foreman may suggest. The more highly trained person is more capable of receiving suggestions than the less trained worker.

Directions concern the technique of an order or suggestion. Orders may be said to concern *what* is to be done. Directions may be said to concern *how* it is to be accomplished. Suggestions may concern either *what* or *how*. An order should be given in such a manner as to leave no doubt in the mind of the person receiving it, as to the intention of the one giving the order, and yet it should be so delivered as to give no offense. A common error of the untrained foreman is to issue his orders in such a manner as to give offense. A good rule to observe with regard to orders, is, first to make sure that the matter is one which will not admit of discussion and then to deliver the order without qualifications and in an impersonal manner. Excuses should not be offered for giving orders. If a

foreman has sympathy for the person to whom the order is given, it should be expressed in a practical way during the execution of the order. The foreman should be explicit in giving directions. Sequence should be observed in giving directions, each detail being arranged in the order of accomplishment.

Lack of technical knowledge on the part of the foreman frequently results in failure to maintain order. The foreman must be just a little better all-round workman than any person in his department, if he is to maintain the respect of his workers. Just as self-respect is a direct result of and in proportion to the practice of self-restraint, so is the maintenance of order in a group, a direct result of higher efficiency on the part of the leader.

TOPICAL QUESTIONS

- 1—Why does continued reproof make discipline more difficult?
- 2—How would you go about it to encourage self-discipline?
- 3—What do you understand by orderly personal habits?
- 4—Give one orderly industrial habit, disorderly.
- 5—Give an instance of each of the six common errors of foremanship.
- 6—As a foreman, what tools do you use?
- 7—What is the test of an order as distinguished from a suggestion?
- 8—Which are the more capable of receiving suggestions, members of a common crew or special workers?
- 9—Write an account of the production of an article during which orders, suggestions and directions are used.
- 10—Give an instance of an order in which a direction is used.
- 11—What do you understand by the delivery of an order in an impersonal manner?
- 12—Which one of the foreman's tools requires the greatest exercise of technical knowledge?
- 13—Why does the assumption of personal policy by the foreman result in labor turnover?
- 14—List ten production proverbs found in this topic.

Topic No. 5

ENFORCEMENT OF COMPANY POLICIES

National and state laws, and municipal ordinances are of three kinds:

- 1—Common law
- 2—Statutory law
- 3—Judicial decisions.

Common law is the basis of all law and represents the sum of the experience of all affected persons. It is the accepted practice, approved by past generations.

Statutory laws, while based upon the common law, are designed to insure cooperation in new situations. As statutory laws become generally accepted, they become known as common law.

Decisions are rendered from time to time, in cases involving the application of common and statutory laws. Such decisions become the law of precedent until such time as the law may be repealed.

Company policies are the laws and ordinances for the government of persons interested in the business. Company policies, like laws and ordinances, are of three kinds:

- Common policy
- Statutory policy
- Official decisions.

Common policies are those policies which have proven their value by continued application. An instance of a common policy is the rule against smoking in shops containing inflammable materials.

Statutory policies are those policies inaugurated from time to time and designed to insure cooperation in new situations for which common policies do not provide. In lieu of the newspaper through which national and state laws and municipal ordinances are made public, the bulletin board is generally made use of in shops to inform interested persons regarding company policy. Some times, other means are used to obtain publicity for company policies, but

whatever means are used, the object remains the same, to inform each and every person of the new policy. While policies may be written in the office and posted by persons from the office, they should no more be looked upon wholly as office policies than one would look upon state laws, as being solely the work of state house employees.

Official decisions are rendered, in new situations, the decisions being based upon statutory or common policy. Industry must follow in the groove of progress, if it would grow. A company can no more afford to overlook the combined wisdom of past industrial experience than can statesmen ignore history while writing laws. In cases requiring decisions, it is of utmost importance that interested persons should be made to feel that the decision is really based upon a common practice of proven value. If a decision is unfavorable to a person or group of persons, they should be allowed to understand that the decision has nothing personal in it. The surest means of conveying an impression that personal animosity enters into an unfavorable decision, is to allow an impression to prevail that at another time a favorable decision has been rendered as a personal favor. The most certain method of obtaining willing obedience to company policies is impersonal enforcement.

In a great majority of cases the foreman is the one upon whom falls the duty of enforcing company policies. In many instances he renders decisions. It therefore becomes necessary that the efficient foreman should have knowledge of the common and statutory policies and official decisions of the company by which he is employed. These policies should be listed under the following headings:

- Safety
- Sanitation
- Production
- Delivery.

All the policies of the company regarding safety, sanitation, production and delivery should be listed. After the list is completed, each policy should be marked C. or S. or D., as the case may require, to indicate whether it is a common or statutory policy or an official decision.

TOPICAL QUESTIONS

- 1—Give an instance of an official decision in your plant which has become a statutory policy, a common policy.
- 2—Give an instance of one common policy in force in your business, a statutory policy, an official decision.
- 3—List all the policies in force in your plant. After the list is completed, mark them C. or S. or D., as the case may be. The list should be prepared under the four headings of safety, sanitation, production and delivery.
- 4—Find three production proverbs in this topic.

Topic No. 6

PROMOTION OF INTEREST

Interest is that bond by which each individual is made to feel ownership of that in which he is concerned. The degree of interest manifested, depends largely upon the employment of means for stimulating the natural desires and instincts of persons in whom a development of interest is desired. Those means of development are usually referred to, as interest factors. Some interest factors are as follows: Ambition, pride, praise, criticism, self-respect, and curiosity. Fear is sometimes regarded as an interest factor but is so seldom permanently effective that it is not included in this discussion.

Ambition is a most potent influence in the lives of men and women, urging them on to unremitting effort in the accomplishment of their hearts' desires. Normal persons are ambitious. Different persons may display entirely different ambitions but the motive force behind the efforts of each will be the same, in kind and amount, provided they are equally ambitious. *Present surroundings should be utilized and present moments improved if ambitions are to be realized.* He who marks time while waiting for a better point of attack, will never realize his ambitions. Each passing moment should be shaped to fit into the fabric of our dream. John D. Rockefeller began his career of oil magnate as a ditch digger. Henry Ford dreamed of his present factory while chipping castings in a foundry. Caruso, the great tenor, drove rivets while employed in an Italian boiler shop. Lloyd George learned something about directing the affairs of Great Britain while mending shoes in a Welsh village. Rockefellers, Carusos and Lloyd Georges are found in every community. In every case, they are efficient wherever they are found.

It has been well said that "Success is nine-tenths perspiration and one-tenth inspiration." It is not enough to encourage ambition, the foreman should also point out that the best way to realize the ambition is to make the most of present opportunities. Without ambition one is dead. Morale is impossible where ambition does

not prevail. If one can not connect his life dreams with his present job, he owes it to society and to himself to go elsewhere. The only real misfit is that person whose ambition runs counter to his daily employment. *A foreman who does not know the ambitions of his workers is in much the same position as a general who is ignorant of the equipment of his own forces.* It is the duty of every foreman to lead each worker to see that the path toward the achievement of his dream lies directly through his present job. Industry is, and should be, recognized to be a great progressive training ground for life's larger opportunities.

The untrained foreman will need to guard against the job being sidetracked for the ambition. It is a mistake to imagine that "The higher the ambition is, the better will the work be done." There is some danger that the work may not be done at all. *The job should be considered as the telescope through which the ambition is glimpsed.* The worker should be encouraged to keep his eye on his job.

Job pride is closely akin to ambition. It may be said to be ambition localized. Every worker should be made to feel that there is something in the work he is doing in which he can take pride. Few great inventions have resulted from deliberate intention to invent a new machine or process. Most of them have resulted from an earnest endeavor to improve the equipment or processes then in vogue. The history of the rise of every worker from the workshop to a position of power and influence, is the record of job pride.

Job pride must be cultivated if a business is to continue in the field. A worker without job pride is always an easy victim of the demagogue. A company that is doing business with workers who are without job pride is doing business on a narrow margin of safety. A company whose workers are thrilled with job pride, will succeed in spite of all obstacles. A foreman who does not understand how to instill job pride, is failing in one of the most important services a foreman should perform. While competition is sometimes relied upon as a means of stimulating job pride, the surest and safest method is to treat job pride as localized ambition, and lead each worker to see his life's ideal, through his job. Job pride, whether it is manifested

through increased production or improved quality, should never be allowed to go unnoticed and unrewarded.

Praise is essential to the encouragement of job pride. Praise, however, is the most dangerous implement the foreman may employ. Like dynamite, it should be used sparingly with a view to accomplishment of the desired end.

The foreman who would employ praise, should remember that some persons are violently opposed to being praised. They are generally persons who have endured the flattery of some thoughtless individual from whom they could not escape, or who have suffered treachery from flatterers. Flattery will eventually destroy every instinct contributing to job pride. The foreman who wishes to build up and maintain an efficient working force, must avoid flattery, if he is to succeed.

Praise differs from flattery in that praise is earned. Praise should never be given except as acknowledgement of accomplishment. Even then, it is better to give praise in an indirect manner. In case some one does well, it is much better to mention the fact to some mutual friend, for in that manner the foreman not only praises the worthy effort of one worker, but stimulates his friends to duplicate his performance. Care should be exercised that the person to whom acknowledgement is made, is really a friend or the praise may be converted, in passing, into disapproval.

If possible, the foreman should endeavor to show his approval of meritorious performance by advancement or promotion or by granting some reward which the foreman believes to be commensurate with the performance. Each foreman should carefully record all requests made by workers and when job pride is manifested in any way, it should be possible to extend recognition by granting a proportionate reward at just the right time.

Criticism is not to be understood to mean merely fault finding. By criticism is meant constructive comment. Foremen should avoid critical remarks unless it is possible to point out the error. This is one important reason why the foreman should possess a greater degree of technical knowledge than those over whom he exercises

authority. Sometimes a foreman can be most helpful by overlooking an error. The conscientious worker will not fail to appreciate such thoughtfulness and will at once understand that it requires more strength of will to allow an error to pass apparently unnoticed than to call it to the attention of the worker.

While it may seem best to let an error pass unnoticed, it is always best to allow the worker to know that the foreman knows. No greater error can be committed than for the foreman to gain a reputation for failure to observe either mistakes or meritorious performances. The foreman should see everything and every worker should realize that the foreman *sees*, but it is not always necessary that the foreman should remark.

If, in the opinion of the foreman, the performance deserves correction, criticism should be offered as a lesson in trade extension. A good rule to follow in offering criticism, is to offer it only when convinced that the error is a result of poor training. *In other words, whenever the mistake is due to ignorance, the foreman should function as an instructor and proceed in an impersonal manner to teach the worker the technique of the manipulation.* Deliberate carelessness may seem at times to call for criticism. Carelessness will be treated during the discussion of another topic.

Self-respect is an attribute which will aid materially in promoting interest in an industry. Self-respect is prior to, and a part of respect for others. Self-respect will reveal itself in personal appearance, home atmosphere, and in business surroundings, in so far as they may be under, or within, the control of the individual.

One of the surest signs of a poorly trained foreman is his determination to break the wills of workers and to demand that the foreman's will be substituted for the worker's will in every instance. Men and women are happiest when thinking creative thoughts. When big business is offering high salaries in a vain search for brains to direct industry, it is a sad sight to behold a foreman refusing to permit creative thinking. Many a worker was spoiled for leadership through having had the misfortune of learning the business under foremen who refused to permit him to think independently.

Self-respect is a direct result of self-restraint and is exercised through independent thinking. In addition to promoting self-respect through independent action and thought, this valuable characteristic may be encouraged in many other ways, some of which are: Clean language, clean habits, manly or womanly conduct, etc. This topic has dealt with the interest factor of self-respect from a production standpoint.

Curiosity is generally considered an interest factor in production but it would seem at best a doubtful one. Curiosity in manipulation, plainly indicates lack of experience because the experienced worker is not curious with regard to those jobs he has encountered many times. Curiosity manifested in manipulation is very good evidence that the worker will bear watching. Curiosity is useful to the foreman as a means of stimulating a desire to earn promotion and advancement. In the latter instance the means of arousing this interest factor are so evident that further discussion would be useless.

TOPICAL QUESTIONS

- 1—Give instances of how ambition, pride, praise, criticism, self-respect, and curiosity may be used to stimulate production in your plant.
- 2—How would you go about it to interest a worker in a job which he regards as monotonous, dirty and without a future?
- 3—If a worker is not interested in the growth of the business, and does not manifest an interest in quality or quantity of production, how would you proceed in order to awaken his interest?
- 4—What is the relation between instruction of apprentices and workers and the promotion of interest?
- 5—Write an account of a conversation about a job in your department in which criticism occurred.
- 6—How would you go about it to inspire self-respect in a worker who had lost his self-esteem?
- 7—What is the difference between a "swell headed" person and a self-respecting person?

- 8—How would you proceed to convince a “swell headed” worker that he is in need of instruction?
- 9—Why is the practice of “putting the swelled head up against a hard job” an error in foremanizing?
- 10—Why is “curiosity manifested in manipulation very good evidence that the worker will bear watching?”
- 11—How may “curiosity be useful to the foreman as a means of stimulating a desire to earn promotion and advancement?”
- 12—Make a list of twenty production proverbs taken from this topic.

Topic No. 7

FIRST AID

Usually the less said by any one outside the medical profession on the subject of first aid, the better. There are, however, some points which will bear discussion which do not have to do with the actual administration of medical or surgical assistance. This topic will be confined to those questions, which may be safely discussed by persons who have not received medical or surgical training. For convenience the topic will be treated in three divisions:

- 1—Company policy
- 2—Infection
- 3—Confusion.

First aid has an intimate connection with labor turnover and therefore is of interest to the foreman. It is particularly this phase of first aid that should receive consideration in this topic.

COMPANY POLICY

Each foreman should know his company's policies, regarding first aid to the injured. These policies should be listed in the order of their importance.

First aid is sometimes considered sentimentally in the factory and workshop. Sympathy is aroused when an accident is witnessed. The injured one receives the attention of every one who can be of assistance. All that may be done to alleviate pain, to save life and to hasten recovery, should be afforded the injured. Such action at these times strengthens the morale and improves the fraternal feeling so necessary to the maintenance of a fine working spirit. Like every thing else, this manifestation of sympathy can be overdone. It should be borne in mind that the injured person is not nearly so much in need of sympathy as of care.

First aid assistance should be an organized assistance. If medical attendants are not present, certain persons in every group

should be prepared to administer temporary aid. All such assistants should be selected and instructed by the physician in charge.

In case of an accident it is natural for every one in sight to gather about the injured person. There are two important reasons for not "ganging up" about an injured worker. First: The injured one is in need of air. Second: It is of utmost importance that the injured person remain calm and unexcited. It is the height of refined cruelty for supposed friends to gather about a fallen shop mate, their faces registering pity, while speaking in funeral tones about the accident. It is surprising how many workers survive these ordeals and return to their jobs and families.

If a company policy is inaugurated to prevent crowding about injured workers, it becomes the foreman's duty to see that workers do not misunderstand the purpose of the policy. Workers should be led to see that the company's policy is intended as a humanitarian measure and that the enforcement will be rigid.

Foremen should have uppermost in their minds the welfare of the workmen when enforcing first aid policies, and should give an impression of personal interest not only to the injured but to the worker who has violated the rule as well. The conscientious foreman will always show a genuine interest in each worker in his department on all occasions. When a foreman has established that feeling of mutual interest and trust he will have gone a long way toward obtaining cooperation in production as well as in first aid.

INFECTION

Many accidents are in themselves unimportant, but result in extended illness and loss of time to the family and the business. In most instances, these apparently simple cases are traceable to infection resulting from unclean bandages, or from the use of nostrums and "curealls" by those persons administering first aid. Cleanliness should be the first law in temporary first aid.

Too many injuries are "treated with contempt" in factories. Foolish young persons sometimes think that it is a sign of strength to ignore slight injuries. In all such cases the foreman should not

fail to exercise his authority and *order* the worker to give proper attention to the injury. In many instances the person will be secretly glad to feel that he is compelled to observe an inflexible rule and to give attention to a "mere scratch."

CONFUSION

Confusion is a cause of much loss of life during administration of first aid. Prevention of confusion is without doubt one of the duties of a foreman. Some one must remain calm and continue to think clearly. That one, should be the person who is looked to at all other times as a leader.

Workers naturally expect the foreman to take command during an accident and to direct the movements of those who are meeting the emergency. Leadership is always demonstrated at such times and if the foreman, whose duty it is to direct in emergencies, is unable to maintain order and obtain results, the natural consequence will be a loss of respect for him.

Leadership is largely a result of careful preparation for emergencies. The foreman can anticipate his action in emergencies, by a careful analysis of possible accidents, and by deciding in advance how to meet them and how to avoid confusion. The wise foreman will prepare a list of probable accidents and with each accident record the action of each person needed in administration of first aid. Consultation with the physician or nurse in charge will assist the foreman to perfect his plan of action.

The most common cause of confusion is dual authority and consequent conflicting orders. If the foreman is the one to be charged with leadership during the administration of first aid he should see to it that he and he alone is the one to issue orders. If some one else is designated as first aid man, then it is the duty of the foreman to lend to this person every assistance his position will allow.

Some rules for avoiding confusion are as follows:

Speak calmly.

Speak distinctly.

Speak just loudly enough to be heard distinctly.

Be sparing of sympathetic expressions.

Use orders rather than suggestions in first aid.

A kindly attitude should be displayed during the whole time and especially while giving orders. It should not be forgotten that every person to whom an order is given is more than willing to carry it out.

One final duty devolves upon the foreman following the occurrence of an accident. This is a result of the peculiar fact that "accidents come in bunches". In a large establishment several accidents will follow each other. It has been assumed that the cause of accident grouping is that the worker's thoughts are occupied with the first case and he fails to pay close attention to his own work, thereby falling victim to his own carelessness. *The foreman can do much to prevent accident repetitions by immediately following each accident with a general inspection of each job in his department.* During this inspection, care should be observed to avoid reference to the accident; every effort should be made to get the worker's mind back to his work and away from the accident.

TOPICAL QUESTIONS

- 1—Why is it dangerous for uninformed persons to give medical aid?
- 2—List the policies of your company concerning first aid.
- 3—How many times each day do workers in your department find it necessary to have foreign bodies removed from their eyes? Who performs the operations? What instruments are used?
- 4—List all the first aid cases you can recall which have been treated during the past month in your department and write *doctor, nurse, foreman or fellow workman* after the entry to indicate who administered first aid.
- 5—How would you proceed to organize your department for successful first aid administration?
- 6—List several errors to be avoided by foremen in time of accident.
- 7—What do you understand by the foreman "following each accident with a general inspection of each job in his department"?
- 8—List twelve production proverbs found in this topic.

Topic No. 8

CARE OF EQUIPMENT

Care of equipment is one of the first duties of a foreman. No matter how highly skilled the worker may be, if the equipment is not kept up to a one hundred percent standard of efficiency, the department will show a decreased production. Poor equipment will soon affect the worker. He will soon lose his interest, while acquiring a feeling that the management, after all, is not really interested in increasing the quality or the quantity of the output. It is not at all necessary that the equipment be renewed at regular intervals. On the contrary, new machinery sometimes results in decreased activity until the worker becomes accustomed to its newness. The important thing is to let the worker realize that the management is not overlooking any chance to keep the equipment up to the highest possible standard of performance.

Equipment efficiency is the result of constant inspection, and attention to detail. For the purpose of analysis, care of equipment may be divided as follows:

- 1—Lubrication
- 2—Cleaning and painting
- 3—Adjustments
- 4—Repairs.

Every foreman should have in his possession a detailed and an assembled drawing of each machine and each piece of equipment in his department. If the drawings can not be obtained from the manufacturers, the engineering department of the local plant should be requested to furnish the prints. *A simple sketch showing oil holes and working parts should be placed in the hands of the operator or fastened in a conspicuous place about the equipment.* In case the company does not employ a draftsman, the foreman may make simple sketches for his own use, and that of the operator.

It is the foreman's duty to see that each operator is familiar with

the lubricating system of his equipment. The fact that an oiler is employed does not reduce this requirement. Machinery is usually stopped during the oiling process and in many cases the operator is near at hand where he can easily observe the manner in which the oiler does his work. So much depends upon proper lubrication that the few minutes devoted to oiling are never lost. In the absence of a company policy regarding lubrication, expert advice should be sought regarding the kinds of oils and greases to be used on various equipment. The foreman should be careful to convey all such information to interested workers.

Cleaning of equipment at regular intervals is an important detail in the care of equipment. It is not the equipment alone which benefits from a policy of maintaining clean tools. Job pride and self respect may be stimulated while encouraging the worker in habits of cleanliness of equipment. A worker who voluntarily keeps a clean machine or bench will be likely to have clean thoughts. His conversation will have a tendency to be clean and his attitude toward his fellows and the company will be apt to be "above board" and generous. Habits of cleanliness in the workshop will reveal themselves on the profits pages of the ledger. Standards of cleanliness should be adopted and rigidly followed. Regular intervals of time may be allowed for cleaning, if a company policy does not prevent. Foremen will find it to their advantage to experiment in order to determine the amount of time required for cleaning various equipment. Just time enough should be allowed for the "standard cleaning". If an error is made in time allowance, it is better to allow too little than too much. In that case it will be an easy matter to increase the time, whereas, if too much time is allowed at first, a decrease will be accepted by supersensitive workers as a curtailment of their personal liberties. If the company has a policy covering the point, the foreman should follow it scrupulously. As in all other cases, any new policy should be approved by the management before being inaugurated.

Paint is a most useful preservative of equipment and is likewise a means of stimulating pride on the part of the worker. A little

paint applied to equipment from time to time, is an effective way of notifying the worker that his equipment is considered worthwhile. It is evident to all who see, that the equipment is valued enough to keep it looking well. It is also a delicate compliment paid to the efficient worker, for he can not help but feel that he is appreciated.

Adjustments should be made when first required, instead of waiting until damage has resulted from delay. Each piece of equipment should be studied with a view to discovering the wearing parts for which adjustments are provided. Each part should be listed in the order of severity of wearing strain or friction. When an adjustment is made, the data should be recorded. When each part has been adjusted once, adjustments can be anticipated with reasonable accuracy. No act of the foreman will serve better to impress the worker with the foreman's ability, than the simple demonstration of his knowledge of the equipment under his supervision. Many an inexperienced worker who has held some quiet-mannered foreman in contempt, has been brought up short, and made to right about face, by a simple display by the foreman, of a complete knowledge of a complex machine at a time when that knowledge was vital. There is a psychological moment for everything, and the foreman will do well to husband carefully his knowledge against the time when its use will be of greatest value.

A useless display of knowledge has an effect of discounting its value. In addition, it sometimes produces the impression that the knowing one has but recently acquired the knowledge so glibly and inopportunately offered.

Repairs may be anticipated to a large degree if the foreman has kept a careful record of adjustments. This is important if time is to be saved which would otherwise be lost while the worker is being transferred to another job. If repairs are anticipated, the worker may be prepared and thus saved the surprise of sudden change to another machine or job, and the shift may be made without loss of time.

The most inefficient worker knows that foresight is a characteristic of the thoughtful foreman. Failure to demonstrate this

desirable foreman quality will lessen the respect of workers for the foreman. Foresight, like genius, is "nine-tenths perspiration and one-tenth inspiration".

Failure to anticipate repairs except in cases of emergency, is always a result of incomplete records of performance and adjustment. Repairs, like adjustments, should be recorded with the date of the repairing. This is particularly true of bearing and wearing surfaces. A record, showing relative dates of like repairs, may indicate relative values of bearing materials.

TOPICAL QUESTIONS

- 1—Prepare rough sketches of each piece of equipment in your department, showing each adjustment and each oil hole.
- 2—What kind of oil is best suited for heavy, high speed machinery?
- 3—If you were certain the oil used on a piece of equipment is the wrong kind, how would you go about it to obtain a different quality?
- 4—Which is the more important to production: lubrication, cleaning and painting, adjustments or repairs?
- 5—Should the foreman understand the proper installation of machinery? Why?
- 6—What repairs will be necessary during the next sixty days to the equipment of your department?
- 7—Prepare a list of adjustments made during the past thirty days on the equipment of your department.
- 8—Which of the three factors of the modified "Richard's formula", is most useful to the foreman in the care of equipment?
- 9—Make a list of twelve production proverbs taken from this topic.

Topic No. 9

RECORDS AND REPORTS

The average foreman is interested in only three subjects for records and reports. These are the subjects in which the foreman is interested as a supervisor. They are as follows:

- 1—Production
- 2—Spoilage
- 3—Delivery.

There are, however, a number of other records and reports, which are sometimes required, and which will not fit into either of these three. These records and reports have to do with human agencies, and are outside the supervisory duties of the foreman. They concern the following details:

- 1—Instruction of workers and apprentices
- 2—Enforcement of company policies
- 3—Promotion of interest
- 4—First aid
- 5—Care of equipment
- 6—Labor turnover
- 7—Materials
- 8—Safety first.

Company policy will dictate the number and kind of reports to be made, and the manner of their construction. Whether or not the company policy requires reports on any or all of the eleven items mentioned above, the foreman, who is ambitious to go forward in his chosen business, will find record keeping to be a constant source of profit.

RECORDS

Inasmuch as all foremen are to be encouraged to keep records of their foreman experiences, recording will be given first consideration in this discussion.

Lack of system is usually a result of failure to analyze. Ordinarily failure to keep records may be ascribed to lack of system.

Production records which suggest themselves in connection with operations and processes should be listed according to the method set forth in Topic No. 2. Records should be brief, but understandable. The form of entry of production records should be strictly in accordance with the analysis of operations and processes.

A loose leaf book in which dividers are placed to provide a separate part for each operation or process, is a very good arrangement. Production records should be listed under the following headings:

- 1—Requirements
- 2—Performances
- 3—Suggestions.

Requirements will be dictated by company policy or delivery orders.

Performances should be listed directly below the requirements and the differences recorded.

Suggestions should be entered briefly with the ideas which may have occurred to the foreman together with those he has received from others which promise in any way to benefit the performance. Care should be observed to give due credit to all who present an idea which seems to have merit.

Example

Required delivery—3,000 $\frac{7}{8}$ "x4" sq. hd. bolts.

Performance—3,103 $\frac{7}{8}$ "x4" sq. hd. bolts.

Suggestion—Storekeeper should be notified at once of over supply in this size.

Spoilage should be listed in the same manner as production. It should be entered with each operation and process under which the spoilage occurred. Spoilage should be recorded under the following headings:

- 1—Part or quantity of material
- 2—Causes
- 3—Suggestions.

Under the first heading should appear a description of the articles or the quantity and kind of material spoiled. Under the second heading should be entered the probable cause of the spoilage. Under suggestions should be recorded any ideas the foreman or others may present for preventing such spoilage. As in case of production, care should be observed to record the names of all those who interest themselves enough to offer suggestions for improving production by reducing spoilage.

Example

Part or quantity of material spoiled—20 $\frac{7}{8}$ "x4" sq. hd. bolts

Causes—Improper adjustments

Suggestions—Worker is in need of instruction, above suggestion offered by worker himself.

Delivery records should be entered as were production and spoilage with the corresponding operation or process. Delivery records should be listed as follows:

- 1—Requirements
- 2—Performance
- 3—Suggestions.

Requirements should be entered with the quantity and the time, the time record constituting the essential difference between delivery and production records. Suggestions for delivery records should follow the form and manner set forth in production and spoilage.

Records regarding the instruction of workers and apprentices should be kept separately. A number of pages in the loose leaf book should be prepared with dividers for each separate operation or process. Each operation or process should be entered according to the number and character of learning difficulties it presents to the learner. The easiest operation or process should be entered first, proceeding from the least to the most difficult. The following information form should be filled in for each advancing job.

Example

Job—Molding brake shoes

Job specification for training. See points 1-2

Information record on learner. See points 3-4-5-6.

- 1—Previous experience necessary—Foundry experience
- 2—Type of worker—Strong-active-man
- 3—Name of person beginning training—John Doe
- 4—Date of beginning training—September 23, 1920
- 5—Date training was finished—October 20, 1920
- 6—Rating of worker—85%.

Information records, like all other instruction records, should not be accessible to workers. A worker whose rating while in training was very poor may become quite expert after becoming accustomed to production. If he should obtain knowledge of his poor showing, he may become discouraged and as a consequence the time devoted to instruction may be lost to the company.

Enforcement of company policies, promotion of interest, first aid, labor turnover and safety first may be entered on pages provided in the loose leaf book, a divider being added for each item.

Five headings should appear under company policies:

- 1—Nature of policy
- 2—Percentage of enforcement
- 3—Difficulty of enforcement
- 4—Instances of enforcement
- 5—Suggestions.

Promotion of interest should be recorded under four headings, one page devoted to each worker.

- 1—Characteristics of person to be interested
- 2—Probable interest factors to be utilized
- 3—Success or failure of application of factors
- 4—Suggestions.

Characteristics of persons to be interested may be obtained in part from the records devoted to instruction of workers and apprentices.

First aid records may be listed under eight headings:

- 1—Probable accidents
- 2—Nature of accidents
- 3—Date of accident
- 4—Names of injured
- 5—Name of person in charge of first aid administration
- 6—Ultimate result of injury
- 7—Date of return of worker
- 8—Suggestions.

Each accident should be recorded separately.

Labor turnover should be listed according to jobs, each job being entered in the order of the degree of skill and training required.

The listing will be found to follow the order used in recording the instruction of workers and apprentices, with the exception that several operations or processes may be grouped under one job, a job in this case being understood to mean the operations or processes for which one worker is held responsible. Instance: A job assigned to one machinist may include grinding valves, turning bolts, milling gears, etc. On the pay roll the worker may be listed as a general workman.

It is not sufficient for labor turnover purposes merely to follow the payroll record. It is much better, first, to identify the job in some definite way, as general machinist (No. 1 or No. 2, etc.) and under that general heading to list all the operations and processes to which the worker may be assigned. Having identified the job in the department, the records should be entered in the following order:

- 1—Name of worker or workers
- 2—Dates workers commenced
- 3—Absences, regardless of cause
- 4—Dates of separations
- 5—Monthly labor turnover.

Each job should be the subject of a separate record.

Standards of production may be assumed to be maintained on each job. If that is true, each absence means double labor on

that job for a period of time equal to the length of the absence, during regular hours or overtime.

Absences should therefore be included in labor turnover computation.

The extra labor power may not be applied at the time of the absence but it is assumed that maintenance of a production standard will eventually result in duplication of labor power on the job for the space of time equal to the time of absence.

If the same worker is continued on the job throughout the month, the labor turnover will be the percentage of the regular working hours in the month (holidays not counted) shown in absences. **EXAMPLE:** If there are 180 regular working hours in a month and the worker has been absent for any cause during 9 regular working hours, the percentage of absentee labor turnover for the month would be five.

Ordinarily absences are not included in computation of percentages of labor turnover, separations and replacements alone being considered. It is apparent, however, that absenteeism must enter into any accurate study of losses, due to shifting of labor. If a separation occurs during the month, the time lost while the worker is being replaced should be included as absenteeism in figuring labor turnover.

Example

Let S = Total number of separations or replacements on any one job, during one month

Let H = Total number of regular working hours in the month

Let A = Total hours of absence during one month

Let T = Turnover percentage

Formula $(S \times H + A) \div H = T$.

Example $S = 4$

$H = 180$

$A = 9$

$(4 \times 180 + 9) \div H = 4.05 = 405\% = \text{Turnover percentage.}$

NOTE—This formula is to be used in cases of stationary or expanding working forces.

Safety first records should be listed under the following headings:

- 1—Avoidable dangers
- 2—Unavoidable dangers
- 3—Rules regarding avoidable dangers
- 4—Rules regarding unavoidable dangers
- 5—Methods of enforcement of rules
- 6—Violations and penalties
- 7—Suggestions.

Probably no field offers greater opportunity to the foreman than does safety first, to manifest an interest in the welfare of his workers, while promoting his own interest. A careful record of safety first factors and activities will enable the foreman to maintain a reputation for having a low accident percentage. Once established, such a record will become a source of pride not only to the worker himself but to the members of his family as well. A good safety first record generally goes a long way toward the maintenance of a low labor turnover.

Records on materials and on care of equipment will require further space in the loose leaf book. Materials should be entered in the following form:

- 1—Raw materials on hand, with date
- 2—Raw materials ordered, with date
- 3—Finished materials on hand, with date
- 4—Suggestions.

By "*on hand*" may be meant the presence of material either at the machine or in the store room. If the foreman's duties include supervision of the store room, supplies "*on hand*" would include raw or finished material in the store room.

The far sighted foreman will save himself much of the inconvenience of being compelled to urge workers to maintain standard production by carefully keeping the raw materials on hand at the bench or machine at all times. The natural tendency of a willing worker who takes pride in performance is to "clean up on the job." If a liberal supply of materials is always at hand the worker may be counted upon to form the excellent habit of steady performance.

While the worker may not voice an opinion in the matter, he and every one else will feel that periods of idleness because of failure to deliver materials are generally evidence of poor supervision on the part of the foreman.

Care of equipment records should include the following divisions:

- 1—Date of installation
- 2—Date and nature of adjustment
- 3—Date and nature of repairs
- 4—Date of replacement.

Job Specification Record

The specifications for a dwelling house set forth the quantity and quality of materials, the number and sizes of the doors and windows, the style and finish of the structure, etc.

Job specification records set forth the characteristics to be required of persons who may qualify for the job and the number of such persons required.

Example

Job Specification Record

Job—Truck driving

Number of persons required—10

Kind of person required—Man

Age limits—18 to 40

Activity—Very active

Strength—Strong

Education—Must be able to read and write and do simple sums in addition, subtraction, multiplication and division

Experience—Must be sufficiently familiar with the truck he is to drive, to make emergency repairs. Must be a good safe driver. Must know the traffic rules and know the locality in which he is to drive.

Other specifications might be required but the ones given above will serve to make up an example.

If specifications were being prepared for aeroplane driving the age limits, education and experience would probably be quite different from the example given for truck driving.

Personal Information Record

Personal information records contain that information regarding persons being examined for positions which will determine whether the prospective employee fits the requirements of the job specification.

Example

Name—John Doe

Age—25

Activity—Fairly active

Strength—Strong

Education—Graduate eighth grade

Experience—Truck driver in this locality 3 years, familiar with trucks used by company. Is familiar with traffic regulations.

Foremen should give close attention to both personal job specifications and personal information records. Eight of the eleven divisions of foremanizing, as indicated by the kinds of records and reports required, are dependent upon these two records for their efficient administration.

The foreman who neglects the job specification and the personal information record, is missing an opportunity to function as a foreman. He is confining his activities to those of a supervisor.

REPORTS

Reports are usually dictated by company policy. Company policy may be either common, statutory, or the result of official decisions on the enforcement of statutory policies. Official decisions will be recognized as those required by office procedure. Reports resulting from common company policy are not always a result of stated requirements. Instance: The management may not have

issued orders to foremen to report fires, but common policy in all businesses would direct that fires should be reported at once.

For convenient listing of reports, additional space should be provided in the loose leaf book, a divider being used to separate reports from records. Reports should be entered under the general headings of Regular and Incidental. Regular reports are those regularly required. Incidental reports are those occasionally required or suggested. Each general division should be recorded in the following form:

- 1—Name of report
- 2—Date requested or suggested
- 3—Date returned or forwarded
- 4—Information supplied.

In making reports it is important to furnish the information as quickly as possible. Many times the report is the only means by which the management may form an opinion of a foreman's ability. Modern business is coming more and more to depend exclusively upon reports for evidence of efficiency of departments and individuals. The wise manager answers the statement that "personality counts" by calling attention to the fact that personality will reflect itself in the performance of a department.

The day of the "Spellbinder" and "Hot air merchant" in industry passed with the adoption of the report method of recording progress. "The weak sister" who depends on "pull" for advancement, or who follows the foolish practice of "playing politics" to gain favor is always opposed to filling in reports. The foreman who has something that will show well on paper, is always eager to report his progress.

One common mistake of thoughtless foremen is to fail to report good performances for their workers whenever possible. Nature abhors a vacuum and the big soul abhors selfishness. Selfish souls like vacuums are always drawing upon others and never giving anything out. If the management is worthy of the name, it will appreciate the unselfish purpose which inspires a foreman to report

the creditable performances of his workers. Entirely aside from the righteousness of the deed, the foreman will find that in consequence of favorable reports, his unfavorable reports are received without question. His unselfish action will have established for him a reputation for veracity which could have been obtained in no other manner.

TOPICAL QUESTIONS

- 1—Which of the eleven principal subject headings for records and reports given on the first page of this topic may be said to be of special interest to supervisors? To foremen?
- 2—Why is it true that, "Ordinarily failure to keep records may be ascribed to lack of system?"
- 3—Prepare one sample record for each of the eleven items mentioned in the topic.
- 4—Prepare one sample report for each of the eleven items mentioned in the topic.
- 5—Prepare job specification records for each job in your department.
- 6—Prepare personal information records for each worker on each job in your department.
- 7—Make a list of fifteen production proverbs found in this topic.
- 8—What is the difference between the records and reports of a supervisor and those of a foreman?
- 9—What are the three common errors in the preparation of records and reports made by foremen?
- 10—How may these errors be overcome?

Topic No. 10

LABOR TURNOVER

Labor turnover will have a different meaning to those who are investigating labor conditions from different view points. There are two principal points of view:

1. **That of the social worker** who is interested in the shifting of the labor market, with its consequent loss of time and wages to workers. This viewpoint would include separations due to workers being laid off owing to slack business or to reduction in the force resulting from the introduction of improved equipment.

2. **That of the trained business man** whose business is handicapped and production curtailed by separations and replacements. The second, is the one with which this topic is concerned, and includes only those separations and replacements which cause added expense to the business. Labor turnover within the meaning of this topic refers to loss to production in man power through extra labor employed to maintain production standards.

Labor turnover expense items are as follows:

- 1—Clerical
- 2—Training (waste of time)
- 3—Waste of material
- 4—Spoilage of material and equipment.

Cost of training workers ranges from \$40.00 to \$750.00 per individual, according to the skill required on the particular job. The loss from separations and replacements on jobs requiring the maximum expenditure for training is small, due to the fact that there is comparatively little shifting among skilled workers. The total loss from labor turnover is brought up to a tremendous total by the great number of unskilled workers who are constantly shifting from job to job. Something must be done to decrease turnover loss or our place as a manufacturing nation will be seriously threatened.

In some industries during the year 1919 the labor turnover reached as high an average as 1,000 to 3,000 percent. In other

words, the yearly turnover of labor for these industries indicated that some workers were replaced from 10 to 30 times in the year. This did not include the absenteeism which in some instances was recorded to be as high as 20 percent of the working force. This means that daily one out of every five workers failed to report. On a monthly labor hour basis, this would result in a loss, due to absenteeism, of 3,600 hours each month in a plant employing 100 workers, 180 regular hours.

Certain educational institutions have unwittingly encouraged labor turnover by advertising widely, advising workers to study something quite different from their present employment. Advancement and promotion should be encouraged, but the surest and least costly procedure, both to the worker and to industry, is the increasing of the efficiency of the worker in his present position. The less skilled machinist who studies to become a better machinist stands a much better chance of becoming a high salaried superintendent than the mediocre mechanic who studies to become a draftsman. "Being a small peg in a small hole is a lot better than being a small peg in a large hole where you are sure to rattle," contains much truth.

When Horace Greeley offered his advice to young men, to "Go west and grow up with the country" he "started something" in the language of the hour, which has proved a real problem to the foreman. It would be interesting to know just what became of Mr. Greeley's young man. Did he go west and grow up there or did he grow up all over the country after the manner of the average worker? *The really big problem the foreman has to solve is, how to reduce labor turnover.*

Employment is the natural place to begin the study of labor separations and replacements. If every foreman could be brought to realize the necessity for occupational training of workers and apprentices, a long step would have been taken toward a permanent reduction of labor turnover. We are just beginning to learn the lesson of permanent bridge and road building in this country, and we must some day give like attention to occupational training.

Of the 30,000,000 children of school age in the United States, 12,000,000 have left the school room at 14 years, 21,000,000 at 15 and 25,500,000 at 16 years. Only 10% finish high school and only 2% finish college. It is right that we should want every child to receive a college education. It is American justice that we should plan our educational system with the college in view, even though 98% of those for whom we plan do not reach this destination. It is also a point in our scheme of human rights, to offer training suited to the life occupation of each youth. If possible every boy and girl should be induced to continue in school, that is the ideal, but we are not dealing with an ideal situation. We are dealing with stern realities.

Eighty-five percent of the school children have left school before their sixteenth year. They are largely unprepared for the battle of life. It is our duty to prepare them. Trade preparatory schools should be conducted in connection with every public school. It should be as much the duty of our schools to train for a definite occupation as it is to train for an indefinite vocation.

Trade preparatory classes for children about to leave school can only hope to prepare children for advantageous entrance upon a trade or industrial pursuit. Any one of experience knows that a trade can not be taught in a school room, that the only place a trade may be learned is on the job.

Before instruction is planned, the industries of the community should be surveyed to learn the labor turnover for each occupation. With a knowledge of the labor turnover for all industries there need be no apprehension regarding the inauguration of training of enough workers to fill the ordinary requirements of the businesses of the community.

Employment bureaus should be set up in each school whose business it should be to locate the job for the person before he or she begins instruction. Thus students might be definitely preparing to connect with one of the dominant businesses of the community. Of course it would be impossible to offer instruction in all the 288 trades and pursuits found in American industrial life. If a person

desires to study a trade which the labor turnover returns of local industries indicate the school should not offer, the person could follow the example of the majority of the two percent who choose to go to college, and go where the training is given.

Training based upon labor turnover would save us the mistake made by many high schools at the present time: that of training two or three times as many persons in commercial work as can obtain local employment. In that case the schools are simply and effectively training the children away from home, for if they would use their training, in most cases they would have to leave their home town. The foreman can do much to aid in the stabilizing of our homes, industries, and government by fostering an interest in the reduction of labor turnover.

In addition to the trade preparatory school as a means of fitting workers for the jobs, the character study for selection of workers as outlined in, *Characteristics and Types of Workers*, given during the topic devoted to *Instruction of Workers and Apprentices*, will aid in making a sensible selection.

After every effort has been put forth to insure, as nearly as possible, the employment of workers to fit the jobs, the next thing is to keep that worker on the job. About three-fourths of the separations are due to resignations. Approximately one-fourth of them are due to discharge. This being the case, it is well to inquire into the causes of resignations.

According to a table published in the *Monthly Labor Review* for October, 1918, and reprinted in *The Turnover of Labor*, Bulletin No. 46, Federal Board for Vocational Education, about one-third of those who resign do so because of dissatisfaction over wages. In this the foreman is vitally interested. No one knows better than the foreman that it is impossible to raise wages to the point of satisfaction. The natural tendency of all mankind is to want the "earth and a fence around it." Persons who can be permanently satisfied will not be worth much in business either as workers or as managers. The thing to do is to lead a worker to realize that the way to get the "earth and a fence around it" is to build his fence

of successful performances on his present job. *Separations resulting from dissatisfaction over wages*, indicate that at least one-third of all the separations are due to "blind alley jobs." Modern industry really has no blind alleys for the worker who will study and apply himself. It becomes the particular job of the intelligent foreman to stimulate the worker to study and to apply himself, and thereby to fit himself for larger responsibilities. So long as we have men who are content to remain in blind alleys we will have a big labor turnover, and workers will continue to roam about from place to place seeking the "pot of gold at the end of the rainbow." The key to the blind alley is always at hand, and it becomes the opportunity of the foreman to present the key of occupational training to the worker and admit him into the broad highway of industrial development.

A study of causes of discharges is also illuminating. One-third of the discharges are attributed to incompetency. Workers subject to discharge offer undoubted material for instruction in occupational practice. If the foreman is trained in the art of teaching, so that he can quickly and surely "put over new ideas," the average worker would not long continue incompetent.

If it does become necessary to discharge a workman for incompetency, the foreman should endeavor to impress the worker with the impersonal necessity for causing the separation. Personal interest should be manifested at all times, at time of discharge as well as any other. "It always pays to be courteous" is a proven fact. The story of the condemned man who requested a polite hangman is indicative of the general belief that, "The punishment prescribed in most cases is sufficient unto the crime." So it is with the worker who is being "fired." He doubtless feels the separation keenly enough without being subjected to additional humiliation.

Misconduct is assigned as the cause of about 20% of the discharges. Company policy will usually guide the foreman in the matter of discharges for misconduct. In case a policy is already adopted the foreman should follow those rules laid down by the management.

If the foreman is allowed to form his own judgment with reference to discharge for misconduct, it will be well for him to remember that if misconduct is allowed to go unpunished, the morale of the whole department will suffer. The foreman can not afford to overlook any act of misconduct, deliberate or otherwise.

There should be a difference in the attitude of the foreman when dealing with persons who have been guilty of deliberate misconduct and those who have been guilty through ignorance. A good rule is, to withhold reproof the first time a slight offense is observed, while letting the offender realize he is observed. Care should be taken that the worker does not see the slightest suggestion of a smile on the face of the foreman when misconduct is observed. If after an experience, during which the worker realizes he is observed in misconduct, he continues to offend, it is best to take steps to correct the evil.

In all cases calling for discharges the foreman should be certain of the support of his superiors. No one other influence will so break down the morale of workers and cause them to lose their respect for their foreman as for them to realize that there has been a reversal of a departmental action or policy.

Absences are generally the forerunners of permanent separations and as such should be included in any study of labor turnover. Among the causes of absenteeism in an industry, it is estimated that at least 3% is caused by sickness, accident and other so-called excusable conditions. This leaves 97% of absences to be assigned to so-called avoidable causes.

The foreman can help to reduce absentee labor turnover by aiding in the promoting of interest and job pride. When the record of absenteeism is lowered the percentage of labor turnover is decreased in two ways: First, through reduction of departmental shifting, and, second, by localizing the worker's interest. The foreman should find out what is "on the worker's mind" and try to teach him how application to his job will help him to realize his ambition. If the workman gets a vision of ultimate success, however dimly it may be glimpsed,

he will show fewer absences against his record and will cease to contribute to avoidable labor turnover.

TOPICAL QUESTIONS

- 1—Which of the two view points regarding labor turnover mentioned in this topic is held by the management of your plant?
- 2—What do you estimate to have been the labor turnover in your department, exclusive of absenteeism, during the past year?
- 3—If your department has an average monthly labor turnover, exclusive of absenteeism, of 50%, how many men are employed each month?
- 4—Assuming the cost of training your employees to be minimum, what is the loss to your plant from a 50% labor turnover?
- 5—Suggest a specific remedy for labor turnover.
- 6—How could the job specification record and the personal information record be made of use in lowering labor turnover?
- 7—If you could have studied something you could have applied to your chosen work, would you have remained longer in school? Why?
- 8—Is there any connection between a labor turnover survey and a school employment bureau? If so, what?
- 9—What is the yearly percentage of absenteeism in your department?
- 10—Why does it become the particular job of the intelligent foreman, to stimulate the worker to study and to apply himself, and thereby to fit himself for larger responsibilities?
- 11—Make a list of twenty production proverbs found in this topic.

Topic No. 11

MATERIALS

A study of materials from the view point of the foreman may be divided as follows:

- 1—Ordering
- 2—Storing
- 3—Developing
- 4—Delivery.

ORDERING

When the foreman orders material, it is presumably for the purpose of having it transformed or changed in some manner by workers in his department. It is assumed that he has definite plans regarding the quality and quantity of articles to be made from the materials ordered. In well regulated plants systems of requisitions are used whereby the management has accurate knowledge, at all times, of the amounts of raw and finished materials on hand. The object of system is to prevent loss: Loss of energy, time, and materials. The foreman, whose mind is generally focused upon his own department, needs sometimes to visualize possible losses through improper ordering of materials. These possible losses may be listed under the following headings:

- 1—Over ordering
- 2—Under ordering
- 3—Ordering wrong materials
- 4—Indefinite ordering.

Over ordering becomes a cause of serious losses if production is being carried forward according to a standard requirement. Raw materials in the store room and in the work shop represent, as a rule, about one-third of the entire investment in a business. Money is power and to invest it needlessly in materials or equipment is extravagance. It is estimated that millions of dollars are lost every year through the inflation of materials. The surest method of inflating the materials stock of a plant is through over ordering on

the part of the foreman. If the foreman orders one hundred parts of raw material from the store room or ware house, the storekeeper has a right to assume that the parts are to be finished and will replenish his stock. In time the management will discover the loss from over ordering, but usually not until after considerable inflation has occurred.

Under ordering is a cause of frequent losses in money and in time and morale. A large amount of labor turnover is directly traceable to under ordering of materials. It is estimated that at least one-third of all absences would be prevented if foremen would cease to under order. Sometimes a poorly trained foreman, in order to keep down his materials charge in the storeroom for a given month, will under order during the last few days of the current month, planning to renew the "*on hand*" stock in his department at the beginning of the next month. This practice always results in failure at certain times to keep the operator supplied with materials. Or the worker, accustomed to seeing a larger stock on hand at the bench or machine, lets down accordingly when the stock is low. Following such an experience, workers will be found discussing the matter during the lunch hour. Speculation will become common regarding a possible lay off due to lack of orders or materials. Absences occur followed by immediate permanent separations of some of the most promising workers, who are really alarmed. The intelligent foreman will aim to keep his "*on hand*" stock up to a certain amount at all times.

Ordering wrong materials is possible only when there is a misunderstanding of job orders or a careless attitude on the part of the foreman doing the ordering. That there is considerable loss through ordering of wrong materials, however, is a well known fact. A foreman is supposed to know what materials enter into his products. It is easy, however, for the untrained foreman to be mistaken in some cases.

A machine shop foreman may receive an order which will call for the making of a valve stem. Perhaps a low grade rolled brass would answer the purpose and he selects a very high grade metal

instead, or the foundry foreman uses number one grade pig iron with first grade scrap in production of sash weights, or the tinner uses a bearing mixture, high in tin and low in lead, when the reverse would do as well. The tool maker may use "*high speed*" steel where a low grade steel would answer the purpose. White pine may be used by the carpenter where yellow pine or poplar would give equal or better service. Wrong ordering is generally a direct result of lack of training on the part of the foreman issuing the order. It is the surest way to serve a notice upon the efficient worker that the foreman is incompetent. Every foreman should make a careful study of materials with a view to learning their relative values and uses.

Indefinite ordering is probably the cause of more real "grief" than all the other kinds of wrong ordering combined. Indefinite ordering may result in a misunderstanding which will cause any or all the evils mentioned in the previous discussion. In making out orders, the efficient foreman will be careful to list his requirements in an orderly and a legible manner. There is an order of requisition which may be followed to advantage. It consists of a simple observation of some fundamental principles used in conversation and correspondence. The order should be written with the following questions in mind:

- 1—What is wanted?
- 2—How many or how much?
- 3—Where wanted?
- 4—Why wanted (or what for?)
- 5—When wanted?
- 6—By whom wanted?

If the foreman will follow this order in planning his requisitions and will write legibly, he will seldom send in an indefinite order. Some times forms are provided which do not follow the order of the above outline. In that case the form should be followed without question. Someone has said that "Most any system is a good system if it is followed." While there are exceptions to this rule, the principle involved is correct. If a system of ordering is in use in a plant, it is better to follow it than to attempt a conflicting variation.

STORING

Storing of materials is a subject which should engage the attention of foremen everywhere. Faulty storage methods may result in more actual damage to a business than is sometimes anticipated. Material loss through improper storage of so-called perishable material is so well known as to require little consideration in this topic, but loss from storage of materials generally considered imperishable is worthy of close observation.

Habits of thrift and orderliness may be encouraged on the part of the workers by painstaking foremen who exercise care regarding the storing of materials in the workroom. The very fact that the foreman, who is looked up to as a leader, is careful about orderly arrangement of inexpensive iron castings, will serve notice on every worker that order is not a matter of preventing loss but is a question of daily living. The manager who always inspected the heels of the shoes of his office boys when contemplating a promotion, was not far wrong. He was merely finding out whether the boy was really neat, or whether he was pretending neatness. The foreman may give just this same impression of neatness according to the attention he gives to seemingly unimportant details. Many a machinist loses his pride in the job and acquires habits of sloth and irregularity through such apparently inconsequential practices as mixing aluminum cuttings with iron cuttings, etc. The loss in aluminum may not be great but the loss through decreased habits of thrift on the part of the worker is far more costly.

DEVELOPING

Development of materials from raw stock to finished product is attended by many operations which may or may not be carried forward in a progressive manner. Each process or operation must receive all the consideration it deserves if development of material is to be improved.

Job favoritism should be avoided in development of materials.

All persons are most successful in doing some one thing and the foreman is no exception to the rule. The industrial foreman

will have had considerable experience in the performance of all the operations or processes in his department. While this is true, it is equally true that he will have been more expert on some one job than on any other. He will, quite naturally, follow the line of least resistance if he is not on his guard against giving undue attention to that particular job. It is as possible for the foreman to show favoritism to jobs as to favor certain workers and neglect others. Production standards are impossible where foremen show "job favoritism." Likewise if production standards are maintained "job favoritism" is impossible. In fact, the adoption of a production standard is about the only means a foreman has of preventing a most natural and human tendency toward "job favoritism."

Production standards are essential to efficient development of materials. All progressive foremen have a production standard not only for their departments as a whole, but for each department job as well. It may not be a part of the company policy to set a production standard, but the thoughtful foreman will have one of his own. It is not at all necessary that the worker shall know a standard exists. The important thing is, that the foreman knows what it is and sees that the standard is maintained on the job. It is interesting to note the attitude of the average worker toward the enforcement of production standards. Interrogation of one thousand workers quitting a plant, well known for leniency toward employees, the investigation covering a period of one year, revealed the fact that about thirty percent left because they were "tired of standing around." In spite of propaganda to the contrary and the lack of organization in some factories, one only need spend the lunch hour in the midst of a group of workers, listening to their stories of production records, to be convinced that the average worker really is capable of "job pride" in maintaining production standards.

If but slightly encouraged, the workers will adopt their own production standards and advance them from time to time. Some foremen show "job favoritism" in the belief that the action of certain leaders will give tone to the whole group. Such action amounts to a confession on the part of the foreman of his own in-

ability to inspire leadership and job pride in each worker. The action usually results in a charge of favoritism against the foreman and not without some justification.

Performance rating is an aid to the establishment of production standards.

The efficient foreman will have his production standard for each job and will occasionally refer to his performance records to discover which job needs most attention. Production standards should be compared with performances and each worker given his rating in the record. Unless the company policy requires it, the foreman should never allow any worker to know the rating of himself or of others. Only the crudest foreman will find it necessary to make public the performance records. When the ratings are entered in the daily, weekly or monthly record, the foreman should set the jobs down on a slip of paper in the order of their performance rating. Such other notes as may occur to him at this time and from reading the other records may be made on the card and the foreman will then be ready to give the attention to each job that it justly deserves.

DELIVERY

Delivery of material divides itself into two groups:

- 1—Delivery of raw materials to workers
- 2—Delivery of finished materials to storeroom or assembly room.

In delivery of raw materials to the worker, care should be observed to make the delivery in such a way as to inconvenience the worker as little as possible. It is most disconcerting to an engine lathe operator to have a large casting thrown against his machine during the time he is taking a finishing cut on a piston rod. There is no record that the ancient Hebrews, who were held captives in Egypt, objected to making bricks. They did object to making bricks without straw. They realized that the straw was denied them merely to slow up and make more difficult the brick making. Likewise, workers seldom complain about work when it is "getting somewhere." They do object strenuously to work which accom-

plishes nothing. Raw material should not be thrown or dumped where the worker must walk in the course of his work. The general rule in the delivery of raw materials, which may apply to other activities as well, is, *do not disturb the worker except in case of emergency or as a means of aiding production.*

In delivery of finished materials to the storeroom or to the assembly room, two points should be observed:

1—Promptness

2—Regularity.

Prompt delivery is a source of pride to the foreman and to the workers. Being prompt in deliveries may be likened to being prompt in keeping engagements. It creates an impression of business management for those who are responsible for deliveries, if these are made on time. If the foreman would advance in the business, he must cultivate habits of promptness in delivery of finished materials from his department.

Regularity of delivery is next in importance to promptness in delivery. Production standards should be set far enough above the requirements, to allow regular quantity deliveries rather than deliveries direct from machine or bench. There are several reasons for this, chief among them being the following: To allow time arrangement on the part of those who receive or check the deliveries, to insure steady and impartial deliveries from each job in the department and to develop habits of regularity among workers. If the plant is organized on a basis of having only a minimum amount of money invested in surplus materials, the foreman will find that his delivery of finished materials will be anticipated in the assembly room and in the stock room. If the same thing is true of all other departments, the assembly room checker or store keeper will be reasonably busy receiving and storing deliveries. If he learns to expect certain deliveries at certain times, he will naturally prepare to receive them at those times. This will result in quick release of the delivery man and consequent decrease in "ganging" around the store rooms and congestion of the gang way.

An unpopular pugilistic champion, upon being offered sympathy because of unfriendly newspaper comment, remarked that he did not "care what they say about me, just so they say something." It is true of all persons. It is natural to want a little attention. If the worker who produces many small parts, employs the delivery man for every few parts, the worker who produces larger parts will feel the lack of attention, or the worker who makes small parts will feel that he is being "rushed." Regularity of delivery is the answer to the problem. Regularity of deliveries of finished materials will go far toward aiding in the establishment of regular habits on the part of the worker. Workers are heard to comment regarding well regulated shops, that "Things go just like clock work there." Regular deliveries of finished material go far to create that clock-like impression. There is something in the idea of "leaving a little work for a little while for the worker to look upon." It stimulates the worker just as the nest egg stimulates the hen. The worker sees the result of his efforts before him all the time, until delivery, and is eager to get "started again" as soon as possible after a delivery.

TOPICAL QUESTIONS

- 1—In what respect is the view point of the foreman different from that of the worker regarding the study of materials?
- 2—Give an instance of possible over ordering in your department, under ordering, ordering wrong materials, indefinite ordering.
- 3—What do you understand by "inflation of materials?"
- 4—How may under ordering lower morale?
- 5—Give an example of how under ordering of materials might increase labor turnover.
- 6—Give an instance of how under ordering might be the cause of absences.
- 7—Why do absences sometimes result in permanent separations?
- 8—Give an instance of how habits of thrift may be encouraged by foremen who exercise care in the storing of materials.
- 9—Give an instance of how a foreman might follow the "line of least resistance," if he was not on his guard against giving undue attention to a particular job.

- 10—Select a job in your department and indicate its production standard.
- 11—Give an instance of how a workman may be encouraged to adopt his own production standards.
- 12—What is the difference to the foreman between job production standards and plant production standards?
- 13—Give each job in your department a number and opposite each number place its production rating on a basis of percent of standard performance.
- 14—Give an instance of how wrong delivery of raw materials may lower the morale of the workers.
- 15—List three common errors in the delivery of finished materials in your department.
- 16—How could you improve conditions in your department through regularity in delivery?
- 17—Prepare a list of twenty production proverbs found in this topic.

Topic No. 12

COOPERATION

The foreman in any business enterprise finds himself hedged about by rules and regulations, common or statutory, resulting from the necessary coordination between individuals and jobs in a solvent business. The solvency and the service of a business depend altogether upon the quality of the cooperation between individuals and groups. The individuals who make up the personnel of an industrial establishment are found to function in three distinct groups:

1—Managers

2—Foremen

3—Workers.

The managerial group includes persons whose principal business is to secure cooperation between the various departments of a business. Generally speaking, the responsibility of a manager is to supervise indirectly the operations or processes of production and of distribution. In that efficient production and distribution are dependent upon cooperation, the manager's responsibility includes maintenance of cooperation between departments and indirectly between workers.

The foreman has direct supervision of the processes or operations in one department and has direct responsibility for cooperation between workers in his department. A general foreman may be given responsibility over several departments, but to the extent that his supervision is indirect, he functions as an assistant manager. Likewise to the extent that his supervision is direct, he functions as a foreman. The principal features of his responsibility are not different from those of the manager and of the foreman. He is concerned with supervision of processes or operations in departments and is supposed to encourage cooperation between departments.

Workers are those persons who are engaged in performing certain operations or processes. A job in these topics is to be under-

stood to indicate the process or operation or group of processes or operations to which one worker may be assigned. The worker is directly responsible for the success of each process or operation to which he is assigned. To the extent that his job must coordinate with every other job, the worker is supposed to cooperate with every other individual in the plant.

Cooperation between groups and between individuals is of such prime importance to any business as to take precedence over all other questions for discussion. A certain manager of a baseball team who had the necessary financial backing, succeeded in bringing together nine players who were recognized as the stars in their particular divisions of the game. The team finished in the "cellar," because those nine stars played independent ball. They were defeated time after time by less experienced players who had learned the value of cooperation. Likewise an industrial organization may consist of the ablest mechanics and workers in the business, the equipment may be the best that money can buy, the sanitary and safety conditions may be all that could be wished for, and yet the business may fail for want of cooperation.

There are two kinds of cooperation: *Personal* and *departmental*. Every individual in a business has an opportunity to share in each kind.

Personal cooperation is that kind which manifests itself in personal interest between individuals. Certain foremen and workers manifest this quality to a high degree. They are delightful companions who, when meeting others, greet them affably, always politely solicitous of their personal and business welfare. It is the kind of cooperation that is encouraged among well bred people. Persons who practice these manifestations of personal interest are said to be refined.

Personal interest must be genuine to be recognized as cooperation. The foreman or worker who outwardly seeks to give the impression of interest while failing in every instance to cooperate in furthering the business and personal welfare of his associates is

deceiving no one but himself. He is soon known for what he is, a hypocrite. Many a business is ruined by a hypocritical personnel.

Foremen should never be forgetful of those little manifestations of genuine personal interest, such as kindly greetings and words of sympathy and cheer but they should accompany such "lip service" by deeds of helpfulness and cooperation in time of need.

Departmental cooperation is that manifestation of interest which finds expression in increased production. It is possible for persons who are unknown to each other to practice departmental cooperation. Such impersonal cooperation is greatly to be desired in a business and should be cultivated at all times. It is not, however, to be understood that genuine personal cooperation is to be neglected. On the contrary, the foreman should be reminded that departmental cooperation is always evidence of willingness to practice personal cooperation. *Hypocritical pretense* of personal cooperation is possible without the desire to cooperate on the job, but pretended departmental cooperation is impossible. This is due to the fact that departmental cooperation is always manifested through deeds rather than through words. Foreman A may tell one of foreman B's workers or the management, that foreman B is a "fine fellow." Foreman A's remark will not prove anything except the possible personal interest of foreman A in foreman B. In some instances, it might be sufficient evidence to convince both foreman B and the management, of the necessity of adopting a policy of "*watchful waiting*" toward foreman A. If, however, foreman A pursues a policy of helpfulness toward foreman B, in the daily production activities, workers and management will become convinced of the sincerity of his interest, whether his interest is expressed by words or by deeds.

The personnel of a business being made up of the three groups mentioned at the beginning of this topic, i. e. *managers, foremen and workers*, and all operations or processes attendant upon production and distribution being absolutely dependent upon the cooperation of the individuals, making up each group, it is well that the foreman should study the influences which may advance or retard cooperation between groups.

Cooperation between the foreman and the management consists chiefly of accurate reflection of the management to the workers and an equally accurate reflection of the workers to the management.

Some one has likened human beings to mirrors walking about reflecting the characters of those whom they meet. There is without doubt, much food for reflection in the comparison. It behooves each foreman to keep his mirror clean and free from cracks.

A foreman whose nature is soured, whose soul is warped and cracked, can not but reflect a crooked image. Of course if the management is lacking in the true principles of business practice the foreman can not fail to carry a share of improper managerial attitude to the workers, but even evident mismanagement does not furnish an excuse for the foreman to become less true to his foremanship obligations.

The Foreman Is the Connecting Link in Industrial Affairs

The industrial organization may be compared to that of a foot ball team. The manager is the coach, who has earned his place by many hard gruelling "games" on the industrial gridiron. He plans the "formations" and the tactics, chooses the leaders and advises the captain with regard to regular "play" and emergency formations and practices. The foreman is the captain who leads his workers into the field, and, in the absence of the manager, endeavors to carry out the policies of the manager. It is his business to "call the plays" as the manager has arranged them, and to lend every effort to secure "team play." In conference with the "coach" the foreman should be careful to place every operation or process clearly before the manager, faithfully calling attention to the condition of the materials and workers in his charge. If a worker has offered a suggestion or performed a special service, the foreman should report the matter faithfully.

An essential part of a foreman's duty is to interpret company policies in the liberal light in which they are intended. Many managers are misunderstood by their workers because their foremen misrepresent them.

A manager of liberal views and temperate habits, may be misjudged by his workers as a result of the restricted view point and intemperate habits of his foremen.

The safe procedure for the foreman who would improve his cooperation with the management is to analyze the management through a careful study of company policies.

Two of the other ways in which the foreman may cooperate with the management are, 1st: *By recommendation of new methods of production and the offering of suggestions for improving plant conditions.* 2d: *By assisting the community to understand the policies and problems of the company* in so far as the community may be interested. This latter means of cooperation is very often neglected with the result that our businesses are misrepresented before communities, by outside persons who seize upon unexplained situations as a means of promoting their selfish ambitions by arousing antagonism against the company. Thus the business is sometimes literally *dragged* into politics, more misunderstanding being the general result.

Fully one-half of the troubles of business institutions could be eliminated through the formation of an executive clearing house, composed of the various foremen and superintendents in a plant, who would gather from time to time to discuss questions.

Cooperation between foremen is of just as much importance as cooperation between the foreman and the management. An ancient Greek fable details the experiences of a man who lost control of his hands and feet, and they, failing to agree, started to go in various directions at the same moment. The application of this fable to the situations in a shop where foremen fail to cooperate is apparent. One of the famous remarks of Benjamin Franklin was directed to those men who, like Franklin, had just finished signing the Declaration of Independence; "Well, gentlemen," said he, "if we do not hang together we shall most assuredly hang separately." Every foreman may do well to be guided by Franklin's remark. No greater mistake can be made by the foreman than to imagine that he can deliberately fail to cooperate with his associates and "get away with it." It simply can not be done.

Cooperation between foremen may manifest itself through the following channels:

1—Personal cooperation.

- 1a. Manifestations of interest through friendly greetings, especially in the presence of workers.
- 1b. Expressions of sympathy in times of illness and distress
- 1c. Congratulations for successful departmental performance.
- 1d. Offers of assistance and sympathy in trying departmental situations.
- 1e. Cordiality of reference during conversation with workers or management.

2—Departmental cooperation.

- 3a. Discussion of, and agreement upon, all interpretations of interdepartmental policies affecting parties to the discussion.
- 2b. Equal distribution of tools and materials in time of shortage.
- 2c. Equal distribution of labor in times of shortage.
- 2d. Prompt information regarding conditions which may affect other departments.
- 2e. Suggestions regarding the improvement of processes, operations or deliveries.
- 2f. Careful inspection of all interdepartmental deliveries.
- 2g. Careful observance of interdepartmental standards of production.

The foreman who observes the twelve rules of cooperation listed above will do much to maintain order in the plant through the establishment of good feeling and confidence.

Cooperation between foremen and workers is possible only when there is a feeling of mutual confidence. Workers must believe in the foreman if they are to render that whole hearted service which is the only service which can result in successful plant operation.

Some one has said that we are "respected for what we know, we are loved for what we do, and sought after for what we possess."

The foreman must "know his business." He must not only know his business, but he must know his worker's business just a little better than the worker knows it himself, if he would maintain the respect of the other. Confidence in a foreman on the part of either the worker or the management is largely a matter of confidence in the ability of the foreman.

A foreman must possess the technical knowledge of each job in his department and in addition must possess whatever auxiliary knowledge is necessary to the doing of each job.

In the matter of gaining and holding the respect of the worker, auxiliary knowledge is probably the most effective instrument.

Auxiliary knowledge, that knowledge which while not being necessary to manipulation, does render manipulation easier and cheaper, is made up of that science, mathematics, drawing and English which is related to manipulation. It is at once apparent that the great opportunity of the foreman to increase his efficiency, to exert additional influence over his workers, and to help develop the business, lies in the direction of auxiliary knowledge.

All progress and all invention results from the application of such auxiliary knowledge. Industry advances so rapidly that the foreman who does not keep abreast is soon discarded. The foreman must do original thinking.

If he is a first class workman, having the technical knowledge necessary to performance, and in addition studies to gain a command of the related sciences, mathematics, drawing and English, he will have equipped himself to command the respect of both management and workers. In as much as the unapplied wisdom of a Solomon will not result in performance, the worth while foreman understands that he will advance himself with both the management and the workers only by applying the new ideas received in study, to the jobs in his department. In this way he will be cooperating with his workers and the management in a most practical manner.

Another fruitful source of cooperation between workers is the foreman's exhibition of interest in the workers. Production is increased, good feeling established, order secured and several persons

made happy, many times, by the mere act of a foreman inquiring in a cordial manner about the health of some worker's family. Judicious interest in the personal affairs of the worker is always appreciated if the foreman enjoys the confidence of the worker. In case of illness in a worker's family the foreman should show his interest in every possible way. It is this kind of interest which lifts the operations or processes incident to production out of the monotonous quagmire of performance and gives a human coloring to business.

One other point may be mentioned in connection with a discussion of cooperation between the foreman and his workers.

Fairness to workers and fairness between workers is absolutely necessary in securing the cooperation of workers. Many times a worker will be found whose supersensitive nature makes it extremely difficult to guard against his developing a feeling of unfairness.

Experience seems to indicate that inattention to detail is more frequently the cause for a feeling of unfairness than failure to give attention to more important matters. Stopping a few minutes each day to chat with one worker, while confining conversations with others to a discussion of operations or processes, always results in giving offense. Even small matters like unequal assignments, tool distribution, material deliveries, etc., are sometimes cause for grave concern. One instance is on record where a serious industrial disturbance was finally traced back to unequal assignment of overtime. Certain workers felt themselves unjustly discriminated against and what had begun in a small way soon developed, by addition of real and fancied wrongs, until the company was confronted with a serious situation.

The foreman should learn the truth of the maxim that, "The obvious is seldom true." Very few indeed, of the industrial disturbances originate as announced. Absolute fairness on the part of foremen will do much to bring about a liberal spirit of cooperation between workers and between workers and foremen.

TOPICAL QUESTIONS

- 1—Is a solvent business always serviceable?
- 2—Is an insolvent business sometimes serviceable?
- 3—List all the persons in your plant who act in a managerial capacity.
- 4—List the jobs in your department.
- 5—What do you understand by coordination of jobs? Give an instance.
- 6—Do increased wages always insure greater production?
- 7—Is production always in proportion to the skill of the workers?
- 8—Give an instance of personal cooperation in your department.
- 9—Give an instance of personal cooperation between foremen in your plant.
- 10—Give an instance of departmental cooperation in your plant.
- 11—What do you understand by the statement that "Personal interest must be genuine to be recognized as cooperation? Give an instance.
- 12—Give an instance of how a business may be ruined by a hypothetical personnel.
- 13—What is the test of departmental cooperation?
- 14—List the good points of your management which you could reflect to your workmen with probable good results.
- 15—How would you go about it to analyze the management through a careful study of company policies? Give an instance.
- 16—How would you go about it to assist the community to understand the policies and problems of your company?
- 17—Which of the twelve rules of cooperation would be most important to your department?
- 18—Why is a feeling of mutual confidence necessary in order that there may be cooperation between foremen and workers?
- 19—What job in your department do you know least about? Why?
- 20—What job in your department are you most familiar with? Why?
- 21—Give instances of how auxiliary knowledge may be used to gain and hold the respect of your workers.

- 22—How might your personal interest in one of your workers result in improved cooperation? Give an instance.
- 23—What do you know about the families of your workers?
- 24—How closely should a foreman associate with his workers?
- 25—What is your understanding of fairness? Give an instance of fairness on the part of a foreman to one of his workers, to the workers of his department as a group.
- 26—Make a list of twenty production proverbs found in this topic. Which one applies most aptly to your department?

Topic No. 13

OUTSIDE INFLUENCES

The foreman encounters certain situations resulting from outside influences being brought to bear upon management or workers. Sometimes these situations are helpful and should be encouraged. Others are harmful and should not receive the approval of persons interested in the development of a business enterprise. These influences are as complex as modern life itself and there is a disposition to pass over many of them as being impossible to understand or control. If, however, the foreman wishes to function efficiently, he should make a careful study of the effect of outside influences.

These outside influences which daily affect business interests may be divided into three classes:

1—**Social**

2—**Educational**

3—**Economic.**

Strictly speaking, there is no fine distinction between social, educational and economic influences. Many will be found which may be readily classified in each group, depending upon the angle from which they are viewed.

An example of a community enterprise, which may be considered either as a social, educational or an economic activity, is found in the moving picture business. For purposes of discussion the following distinctions are set up:

Social influences, as considered in this topic, may be understood to arise from those activities outside of organized instruction to which employed persons devote their surplus time.

For example, the cleaning of streets and alleys in a community is a social interest for those individuals not regularly paid for such work.

Educational influences, as discussed in this topic, embrace all organized instruction which is intended to increase the civic or vocational intelligence of the student group.

Economic influences, as discussed in this topic, are the wealth using activities employing the surplus time.

Economics as usually considered, includes both the wealth getting and the wealth using activities of mankind. Wealth getting activities constitute the regular employment.

SOCIAL INFLUENCES

Each social activity affects every other activity of any kind hence business activities are affected by all surplus social activities. The surplus social influences must be reckoned with by the foreman who would become a leader. Some surplus social influences are as follows:

- Recreational activities
- Public meetings
- Amusement activities
- Sanitation projects
- Welfare activities.

Religious development might be included among surplus social activities but the experience of many organizations indicates quite clearly the mistake of including religion or politics in discussions among foremen.

Recreational activities include public games, swimming pools, gymnasiums, parks, play grounds, etc.

Reflection upon the meaning of the term "re-creation" will serve to guide persons in promotion of recreational activities. If they are intended to re-create, i. e. make people over again, they can be given serious consideration as recreational activities.

Public games should be organized primarily for three purposes: To foster good natured rivalry, to develop leadership and to provide physical exercise. Each public game introduced into a community should be tried by this rule of three advantages, and, if it fails to offer all three, it should be advanced with a degree of caution.

Swimming pools and gymnasiums offer additional well balanced recreational opportunities. Like public games, their success depends

upon proper supervision. Recreational supervision must manifest itself, as in the case of shop foremanship, by such quiet effectiveness that the supervisor will have been forgotten in the supervision.

Parks are factors in the community life which deserve the cooperative scrutiny of foremen everywhere.

Some one has said, "Show me the books a man reads and I will tell you what he thinks." This may or may not be true of books but it certainly is true to a great extent with regard to the places frequented by people. A well known maxim is to the effect that "A man is known by the company he keeps."

A community without a park is like a home without a living room, just kitchen, work room, and bedroom. "All work and no play makes Jack a dull boy." Every one is convinced of the truth of this adage. People are also coming to understand that "All work and no play" will result in a dull community. Dull communities with wide awake business insitutions are impossible.

Public meetings, as discussed in this topic, include meetings for discussion of civic questions, for the adoption of civic plans and social gatherings where community singing, exercises, etc., are enjoyed.

It is not the purpose of this topic to suggest that foremen should enter into public meetings with any preconceived idea of gaining control in the interest of the business in which they are engaged. On the contrary, it is the purpose of this topic to point out that the interest of the community is paramount. Men, women and children must come first. Good citizens mean good businesses. Honest business desires nothing more than the earnest cooperation of good men and women. With that assured, our businesses will move forward without one moment of misgiving.

Foremen who earnestly endeavor to better the condition of their neighbors, through promoting community welfare by sharing in the responsibilities of public meetings, earn and maintain the confidence and respect of their managements and of their workers.

Amusement activities require a greater amount of close supervision than any other kind of social activity. Their usefulness

depends upon the degree to which they represent the interests of the general public. They should be organized to provide entertainment for a majority of the residents.

Those amusements which meet with greatest objection, and whose service is generally open to question, are usually organized to provide entertainment for a relatively small group. Exceptions may be found as in the case of racial associations, etc. The same rule will apply within a racial group, i. e. the amusement should be organized to provide entertainment for a majority of the group it is supposed to serve.

In deciding upon the character of an amusement, a community may employ the following questions for guidance:

Will it provide relaxation?

Will it develop a sense of humor?

Will it improve the cordiality of the relations of the general public?

Will it serve a majority of the citizens?

Amusements meeting the requirements set forth in these four questions may be looked upon by the foreman as positive aids to the promotion of the general welfare of the community and they may be depended upon to inspire cooperation among workers. Business managements everywhere recognize the helpful influence of clean amusements.

Sanitation projects are social activities demanding the attention of every citizen. They embrace:

1—Sewerage provisions

2—Street cleaning

3—Weed cutting

4—Garbage removal

5—Water distribution.

The need for interest in sanitation projects is so apparent that it is assumed to be self-evident to any person of sufficient intelligence to assume foremanship responsibilities.

Neatness and cleanliness in the community as well as in the homes will be reflected in the office, factory or shop. The foreman

can do much to establish a high standard of workmanship by lending his best efforts toward the establishment of high standards of citizenship. Sanitary communities and homes mean less sickness, lowered labor turnover and larger production. Foremen should be familiar with sanitary measures and should assist in every way possible the furtherance of sanitary projects.

There is a general tendency to associate physical uncleanness with evil practices. It is likewise true that we trust clean people rather than unclean persons. The general attitude of the foreman on questions of public sanitation will be accepted by many as an indication of his general character.

Welfare activities include hospitals, dispensaries, social settlements, and service associations.

Hospitals and dispensaries are always a source of pride to citizens and serve to attract physicians and surgeons of ability to a community. The community having adequate hospital facilities has less labor turnover and less labor loss through accidents. Foremen should interest themselves in hospital arrangements and encourage an interest on the part of their workers.

Social settlements aim to provide recreation, amusement and education for a group of self-supporting persons always found in large centers, who do not share in the advantages of an abundant home life. They endeavor to approximate the home opportunities and to promote civic development.

The foreman should be encouraged to investigate the extent to which welfare activities are needed and invest a portion of his surplus time, energy and means in these activities.

Service associations are sometimes wrongly referred to as "provident associations," "welfare societies," etc. It is a deplorable fact that every city has, within it, a number of persons who, at times, are urgently in need of comfort and assistance. It is not an ideal condition and successful persons are apt at times to underrate the importance to the community of well organized *service* associations.

Many cases cared for by such societies are emergency in char-

acter and many good men and women receive timely assistance which enables them to take their places again as units of productive society. Foremen may do much to aid community life as well as business enterprises by helping such associations to be recognized as service rather than as charitable institutions.

EDUCATIONAL INFLUENCES

Educational influences brought to bear upon business from the outside, may or may not be of assistance to the foreman in promoting the efficiency of his department. Vocational education has come to be considered of paramount importance by many persons of experience in industrial management. Some facts which aid these persons in reaching this decision are as follows:

Exports by Countries, 1913

Germany.	Finished materials	85%	Raw materials	15%
Great Britain. . . .	"	"	66 $\frac{2}{3}$ %	"
United States. . . .	"	"	33 $\frac{1}{3}$ %	"
				66 $\frac{2}{3}$ %

At that time the ratio of development of vocational education between Germany, England and the United States followed closely the ratios of the percentages of exportations of finished materials. In 1916 the United States ranked with Russia and China with regard to vocational education.

That there are other reasons for concern than are revealed by these figures taken from the records of exportation, is evident from the fact that there are approximately 7,000,000 persons residing within the borders of the continental United States who are unable to read or write in any language.

At present, immigrants are arriving by the way of Ellis Island alone, at the rate of eight to ten thousand a week. They are required to be able to read and write at least twenty words in some language.

From thirty to fifty percent of the males more than twenty-one years of age, living in the large American cities, are foreign born. While the mere fact of foreign birth does not suggest illiteracy, in

many cases it does mean a low order of productivity due to inability of foreign born workers to cooperate through their failure to speak and to understand a common language.

Foremen should lend their aid to Americanization instruction. Americanization subjects usually embrace: English language, spelling, penmanship, reading and civil government. If foremen will manifest a definite interest in Americanization classes, the better class of foreigners will understand the value of citizenship.

Vocational education and Americanization are two educational projects which promise abundant returns to the foreman for his investment of interest and time.

Educational mistakes are possible and foremen should learn to look carefully before extending their assistance to educational schemes.

Each proposed educational program should submit to the following analysis:

Will the instruction promote the civic or vocational intelligence of the worker?

Will the instruction inspire a larger service to mankind?

Is the instruction related to the worker's present or future job in the plant, and will it be likely to make him more contented in his present position?

These three rules should apply to every proposed plan of education which is encouraged by factories and shops.

It is estimated that there is a loss of from thirty to sixty percent of the energy devoted to general education in the United States. This loss is almost entirely due to unapplied instruction.

Commercially minded agents persuade workers to enroll in whatever course seems most attractive without giving a thought to the opportunity the worker may have of using the knowledge he may obtain through the study.

Business institutions sometimes encourage workers to give respectful attention to agents who thoughtlessly contribute to the labor turnover of the plant by urging workers to begin studies which must eventually cause them to leave their employments and seek

work where they can use their newly acquired knowledge. It is impossible to estimate what part of labor turnover is due to the failure of employers to take an interest in the educational development of workers.

In addition to increased labor turnover through trade changing education, production is lowered to a marked degree many times through the study of unrelated subjects. The worker, whose mind is continually being turned aside from his daily work, will be less efficient than the worker who is being inspired in production through studies related to his daily job.

It is not the purpose of this topic to suggest what education should be offered to workers. A worker should be free at all times to enter upon any serious study which offers advancement or promotion either on his present job or in an entirely different business. Sometimes a change is beneficial to all concerned. In such cases a worker should be encouraged to fit himself for future service.

Individual cases will require individual attention. While the foreman may not interfere with the educational plans of workers, in so far as the plans do not interfere with production, he has a right to assume that, in most instances, the future of employees is "with the business." Records of individual cases prove, that in most cases the worker who continually changes his trade or pursuit, seldom succeeds in advancing himself.

In the interest of the workers themselves the foreman will do well to apply the three rules of educational efficiency to proposed schemes of education.

ECONOMIC INFLUENCES

Economic interests are of concern to foremen in so far as they affect the mental or physical condition of workers. People generally may be grouped in three divisions for purposes of economic study.

- 1—Prosperous
- 2—Self-supporting
- 3—Dependent.

Figures relative to the numbers and ages of the persons in each

group are supplied by the American Bankers' Association. "Of each one hundred, self-supporting men, twenty-five years of age, one is rich at sixty-five, three are well to do, six are still working for a living, thirty-six are dead and fifty-four are in charitable institutions or totally dependent on relatives or friends."

A study of the economic status by ages of a hundred average men twenty-five years old is of interest. "At thirty-five years, thirty-five have saved nothing; forty have moderate means; ten are in good circumstances; ten are wealthy; five are dead. At forty-five years, thirty are dependent on children, relatives, or charity for support; forty-six are self-supporting but without means; three are in good circumstances; one is wealthy; thirty-six are dead."

Figures were supplied by the same source regarding the conditions of the homes where the husbands and fathers have died. "Of an average hundred widows, only eighteen are properly provided for or are left in comfortable circumstances. Forty-seven of the remaining eighty-two have to go to work at some gainful occupation in order to keep the home intact and educate the children. Thirty-five, because mentally or physically defective, are thrown upon the state, charity or relatives for support."

It is a duty of the foreman to aid in encouraging thrift among his workers. Thrift is the most practical means of meeting the economic problems presenting themselves to the average worker. Other means than thrift for solving economic problems of workers may be talked about, but thrift, which harms no one, may be practiced at once.

The foreman should be careful not to preach thrift. Preaching is an art which is not included in the occupation of foremanizing. Thrift, like religion, morality, and patriotism should be lived to be appreciated. Other outside economic influences might be mentioned but inasmuch as the majority are intimately related to the question of thrift, this discussion is limited to the use of the means of subsistence, commonly known as wealth.

TOPICAL QUESTIONS

- 1—List the outside influences which you have reason to believe affect your department either directly or indirectly.
- 2—Which of the above influences do you consider harmful? Why? Which do you consider helpful? Why?
- 3—Prepare a separate list of social, educational and economic influences. Which of each do you consider to be harmful? helpful?
- 4—Give an instance of how a social influence may be the cause of decreased production; an educational influence; an economic influence.
- 5—List the surplus social, educational and economic activities in which you engage. Check those which are helpful to the community and to the business in which you are engaged.
- 6—List the workers in your department and record with their names the various surplus social activities in which each worker is engaged.
- 7—Give an instance of how public games might interfere with production in your department; of how public games might aid production; swimming pools, gymnasiums, parks, public meetings, amusement activities, sanitation projects, welfare activities.
- 8—Do you believe it is possible to secure personal or departmental cooperation from workers without knowing something about their surplus activities?
- 9—List the amusements in your community and apply the four rules for the selection of amusements to each. Grade them in percentages according to their character.
- 10—Will the outside influence which helps the worker and his family always prove beneficial to production? Give examples.
- 11—Would increased interest in sanitation projects aid your business? If so, give an instance from your own department.
- 12—List the workers in your department with their residences.
- 13—Prepare lists of those workers whose residences have adequate

sewerage provisions, street cleaning, weed cutting, garbage removal, water distribution, respectively.

- 14—How would you go about it to improve the sanitary conditions of the homes of the workers in your department if the conditions threatened production?
- 15—List the welfare activities in your community.
- 16—Give an instance of how adequate hospital service might lower labor turnover.
- 17—Is there a social settlement in your community? How could a social settlement aid in bringing about cooperation in your department?
- 18—Give an instance of how a service association may be a harmful influence to your department, a helpful one.
- 19—Give an instance of an educational influence which would prove beneficial to your department, a harmful one.
- 20—Suggest three ways by which the production of finished materials may be increased.
- 21—How does failure to speak English interfere with production? Give instances, if possible, from your department.
- 22—List the subjects which you have studied and state how each subject aids you in your present employment.
- 23—List the subjects being studied at the present time by workers in your department and state how each subject may benefit the worker in his present employment.
- 24—Give an instance of how trade changing education might increase the labor turnover in your department.
- 25—List the workers of your department and opposite each worker's name, indicate the subjects which, in your opinion, he should be encouraged to study in order to improve his opportunity to advance in his present employment.
- 26—Why should foremen avoid preaching thrift?
- 27—How would you go about it to encourage thrift among your workers?
- 28—List twenty production proverbs found in this topic. Which one do you consider most applicable to your department?

Topic No. 14

OPERATIONS AND PROCESSES

Operations and processes are the advancing details of
production

OPERATIONS

An operation, within the meaning of this topic, may be said to be one single completed action or movement which does not result in a marketable product. In this sense a single upward stroke of a pen would constitute one operation. This definition is offered in view of the fact that many separate movements are of such importance as to demand specific attention.

There are two kinds of operations:

- 1—Independent
- 2—Common.

An independent operation may be defined as one which has a single definite aim and makes up a complete transaction which may be performed independently of all other operations.

The test of an independent industrial operation should be: Would it be considered an important separate job under a highly specialized method of production?

An example of an independent operation will be found in the pulling of the trigger while firing a rifle. Many separate movements or operations enter into the discharge of a firearm. All of them combine to prepare the way for the one final trigger-pulling operation. The technique of all other rifle-firing operations is affected by the manner in which the trigger-pulling is done. It is at once apparent that trigger-pulling should be treated separately by any one who proposes to make a study of the operations included in discharging a rifle.

A production example of an independent operation would be pouring molten metal into a mold. This important operation can not be subdivided. Many different workers may unite in setting

the ladle and making ready to "pour" but the actual opening of the "gate" on the ladle consists of just one operation.

A **common operation** may be said to embrace those movements which are always performed in rapid succession and which have one principal common aim, which may be accomplished without regard to other aims. A common operation may be defined again as a series of related movements which, when performed separately, do not complete a transaction.

The test of a common industrial operation should be: Would the operations, no one of which is more important than the other, be combined as one job under a highly specialized method of production?

An example of a common operation would be loading a rifle. Loading is one transaction, aiming another and firing the final accomplishment in the use of firearms. Many separate movements enter into loading, no one of which, if performed separately, will complete a transaction.

A production example of a *common operation* would be "tightening" a nut on a bolt. This consists of a series of unimportant operations, all of which are necessary to the accomplishment of a definite aim. No matter how highly specialized the system, but one person would be used to perform this series of operations.

PROCESSES

A **process**, as considered in this topic, may be understood to mean any advancing series of industrially related operations, resulting in a marketable product.

An instance of a production process would be that of transforming wheat into flour. A great many independent and common operations enter into the manufacture of flour. They are all related to flour production and would therefore constitute the process of flour manufacture.

If a bakery were operated in connection with a flour mill there would be but a slight relation between the operations encountered in flour manufacture and in bread baking. While the materials are

very similar, the operations are quite unlike. One would be the process of baking, the other that of flour milling. Industrially speaking, each process should end in the production of a marketable product.

The immediate aim of an operation will determine the process in which it is located.

A foreman functions in two ways:

1—As a supervisor of operations and processes

2—As a promotor of production enterprises involving operations and processes.

Supervision of processes and operations is the first and constant duty of a foreman. It is the duty of the supervisor to see that each advancing operation is given just the attention it deserves.

Supervisory knowledge is that knowledge which is represented by the first two factors of the modified Richard's formula; i. e. $M + TK$. (M = manipulation or doing. TK = technical knowledge or that knowledge which is necessary to manipulation.) The weights to be given each factor may be determined by the requirements of the case. Successful foremanizing demands that the supervisor have at least as much technical knowledge as is required of those he is to supervise.

One man having charge of several machines might be engaged exclusively in the supervision of operations and processes. In that case he would merely be responsible for the technique of the manipulations making up the various operations of the processes in which he is interested.

There are many questions in which the foreman, as a supervisor, is not interested. Those questions are all related to the human factor in industry. Labor turnover, promotion of interest, occupational training, first aid, maintenance of order, giving of orders, directions and suggestions, records and reports, outside influences, cooperation and safety first, all these may interest the wide awake foreman, but are not a part of his supervising business.

The foreman as a supervisor is vitally interested in production, spoilage and delivery.

Production standards are possible only where operations and processes are efficiently supervised. Spoilage is, to a great extent, due to inattention to the operations entering into production processes. Delivery is possible to the extent that supervision is effective.

The production foreman as a supervisor is interested in mechanical operations and processes. He may be engaged in an enterprise wherein machinery is not used. All the operations and processes may be performed by hand labor and yet his essential interest is in the mechanics of the operations entering into the processes for which he is responsible.

In short, the supervisor is concerned with the workers as machines. Each hand is a piece of machinery which more or less skillfully performs a number of operations.

As a supervisor the foreman is interested primarily in the relative skill with which hands or machines perform. If a hand or machine is not up to the standard of skill, the supervisor must do one of three things: Replace, repair, or adjust the defective agent. The operation is the chief point of interest. The supervisor is interested in the manner in which the machine or worker carries out the operations after the adjustments or repairs are completed.

As a supervisor the foreman must analyze and classify each advancing operation in each process if he would possess a ready knowledge of the degrees of accuracy and of speed which should be required on each one.

If every business could rely upon an army of skilled hands with which to replace incompetent workers, or if automatic machinery were developed to the point of certainty of performance, the foreman could be content to function merely as a supervisor.

Promotion of operations and processes is an important duty of the foreman in so far as production must be carried forward by means of untrained or partly trained workers or of undeveloped equipment.

Industrial promotion by foremen may be divided as follows:

Improvement of equipment

Improvement of workers.

Improvement of equipment will generally be found to result from an application of auxiliary knowledge to the operation or process at hand.

An example of such application would be the speeding up of a drill press, to be used in drilling $\frac{1}{2}$ in. holes in machinery steel. In the event that if a new and better grade of tool steel is used in making the twist drill, the peripheral speed may be greatly increased.

Example

Recommended speed of the new drill. . .	800 revolutions per minute			
Speed of the drill press.	600	“	“	“
Necessary increase of speed.	200	“	“	“

PLAN FOR IMPROVING EQUIPMENT

As a means to the improvement of equipment the foreman may proceed as follows:

- FIRST—Carefully list all the operations performed in the use of the particular equipment to be improved.
- SECOND—List all the technical knowledge required by the operator while manipulating.
- THIRD—List all the empirical knowledge (that knowledge or information which will not admit of discussion, as names, numbers and locations), required by the operator.
- FOURTH—List all the auxiliary knowledge (that knowledge the use of which would render the performance of the operation easier or cheaper.)

Having arrived at the auxiliary knowledge commonly known, by eliminating the technical knowledge and the empirical information, the foreman is ready to proceed to apply additional mathematics or science to the operation or process analyzed, thereby improving the equipment.

An example of improvement of equipment is found in the fountain pen. The modern fountain pen is a natural development of the quill pen of our forefathers. The quill was followed by the steel point, which was at first an exact duplicate in steel of the quill point.

The number of operations in the process of writing was reduced by the number of times it had formerly been found necessary to trim the point. The other operations remained the same for the steel point as for the quill. There are many operations which enter into the process of writing with either kind of pen, among which the inking of the pen point evidently offered greatest opportunity for improvement.

An example of the use of the plan for improvement of equipment will be taken from one operation, that of inking the pen point. It would be as follows:

OPERATION—Inking the pen point.

TECHNICAL KNOWLEDGE—Where to thrust the pen point. When to thrust the pen point. How to dip the pen point.

EMPIRICAL INFORMATION—The name of the instrument (pen).

The name of the fluid (ink). The name of the writing sheet (paper). The location of the ink (forward to the right).

AUXILIARY KNOWLEDGE—Too much ink will drip and blot.

Too little ink necessitates frequent dipping. Dipping the point to a certain depth will prevent blotting and will insure a longer flow of ink. A hole or depression above the point will hold ink and reduce the number of dipping operations.

The natural conclusion would have been that the number of operations in the process of writing could be reduced by devising some method whereby a greater amount of ink could be safely carried to the point from a larger reservoir above the point. Having arrived at the commonly known auxiliary knowledge through the elimination of the technical knowledge and the empirical information, the inventor of the fountain pen quite naturally proceeded to apply additional mathematics and science to the problem of producing a self-feeding pen.

The only reason for suggesting the analysis of an operation for technical knowledge and empirical information is to offer the foreman, who may be untrained in making analyses, a graduated plan for arriving at the auxiliary knowledge. When he becomes expert in analysis he will be able to recognize the auxiliary knowledge used

on the job at once and will not need to set down the technical knowledge and the empirical information as a means toward the recognition of the auxiliary knowledge.

A division of processes into operations and a study of each operation to discover the auxiliary knowledge in it, will always be necessary as a part of a plan for the improvement of equipment. In analysis for improvement of equipment the foreman should proceed after the manner of a physician who seeks to improve the health of a patient by first making a study of the patient's symptoms or daily habits. Having listed these, he will then decide which one suggests the greatest need for treatment with a view to improvement of the patient's health. In the improvement of equipment the foreman becomes an industrial physician who is being paid to improve continually upon the condition and performance of the equipment of his department.

Any change which may be effected by means of applying auxiliary knowledge must be followed by presenting additional technical knowledge and empirical information to the worker.

Improvement of workers with regard to their mental attitude has been treated in other topics. In this topic the worker's development from the viewpoint of improved technique will be discussed.

Improved technique is a result of continued systematic manipulation. Once the principles involved have been mastered and a satisfactory series of manipulations planned, attention should be turned in the direction of the development of habits which will result in improved technique.

In promotion of operations and processes the foreman will do well to avoid the mysterious. So long as one or more of the principles or materials involved are not properly understood by the foreman, he will be unable to apply the necessary auxiliary knowledge to the problem of improvement. Any lack of technical knowledge will, with equal certainty, prevent improvement in manipulation.

The foreman, as a promoter, is concerned with the worker as a human being. He realizes all the possibilities of development

and retrogression due to good or bad habits of performance in production. As a promoter, he is alive to every opportunity for improvement of the worker.

The foreman as a promoter, is interested in production standards not only as a means of insuring systematic performance but as a means of establishing habits of punctuality and associated thinking on the part of the worker.

It is apparent to any reasonable person that the growth of any business must depend upon the extent to which the foreman functions as a promoter in addition to his job as a supervisor of operations and processes. This field for improvement is wholly outside that of supervision. Some foremen are yet to be found who still profess, or seem to profess, to function in a supervisory capacity only.

The lack of interest in the development of their workers is the best evidence some foremen offer as proof of the fact that they have not risen above the supervisory stage of foremanizing.

The modern foreman can not limit his interest to machinery, he must know men. It is not enough that the foreman should know operations and processes, he must know how to inspire men in order to improve both the job and himself.

Men do not wait until the hour of death to begin to die. Men begin to die the moment that they cease to grow.

The foreman who is content to do as well today as he did yesterday is "flirting with the production undertaker." The foreman can not stand still. *He must grow or go.* Production must go forward, it cannot go backward. Business cannot stand still.

Consideration of the question of *operations and processes* from the two angles of supervision and of promotion is of especial interest when attention is given to the relative importance of common and independent operations. Common operations require more habit and less original thinking than independent operations. A recognition of this fact opens up a field of investigation for the thoughtful foreman which leads directly to improvement of methods and equipment.

Occupational judgment may be said to be developed by the

worker through constant duplication of action and thought in common operations.

Any operator will know how to deal with a situation over which he has held a mastery for several years. A machinist may have learned that cast iron is brittle, or that oil is not required in drilling cast iron. A carpenter may learn that hickory or oak is tougher than white pine. Each day after these things have been learned, the mechanic may be called on to exercise this particular knowledge. The possession of this knowledge does not require the exercise of a high degree of intelligence. He does exercise judgment, that judgment being a result of repeated experience. He knows a certain thing and that knowledge makes him a better carpenter or machinist. He has, by experience, acquired occupational judgment.

Occupational intelligence is called into practice when a person is confronted with a new situation, for which he has no particular preparation. A pattern maker who has always made patterns to be used in making molds for cast iron may be called on to make a pattern for a brass casting. His experience has never included brass shrinkage, yet his experience with cast iron will cause him to question the shrinkage of brass. If, while his mind is thus stimulated, he receives instruction in related science, he will think beyond his past experience. Related science will enable him to borrow ideas for future investment. His judgment will not be based upon previous experience. His decision will be founded upon a general reasoning rather than on any particular information. Investigation will result in greater efficiency. The pattern-maker will have exercised occupational intelligence.

Occupational judgment is called into practice in meeting with an occasional experience; occupational intelligence is exercised when a new situation is encountered. Occupational intelligence is an important consideration in occupational instruction and training.

The foreman will find the chief opportunity for promotion of operations or processes in the development of occupational intelligence in connection with the performance of independent operations.

In addition to the opportunity for improvement of methods

and equipment through study of independent operations, the wide awake foreman will understand the advantage of reserving the common operations for those workers who are less capable of government by suggestion. Reference to job specifications and to personal record data will convince the foreman of the advisability of reserving the independent operations for those workers who are most capable of doing original thinking.

TOPICAL QUESTIONS

- 1—Select a simple job in your department and list all the operations.
- 2—List the independent operations carried forward in your department.
- 3—List the common operations carried forward in your department.
- 4—List the processes carried forward in your department.
- 5—Select five independent operations and indicate their aims; five common operations and their aims.
- 6—List the processes carried forward in your department, indicating the independent and common operations entering into each process.
- 7—List the jobs which you supervise but do not promote.
- 8—List the jobs which you promote but do not supervise.
- 9—Select one independent and one common operation carried forward in your department and indicate the manipulations in each; the technical knowledge.
- 10—List the equipment of your department and suggest possible improvements.
- 11—Why may the study of related science, mathematics and drawing result in improvement of equipment?
- 12—List the independent and the common operations carried forward in your department together with suggestions for improvement.
- 13—Why do independent operations offer greater opportunity for promoting industry than common operations?
- 14—Select a simple piece of equipment in your department and apply the plan suggested for improving the equipment.
- 15—Give an instance of the "mysterious" in your department.

- 16—Suggest three ways by which you may help your business to grow.
- 17—List the habits which may be developed in the course of the performance of one common operation.
- 18—What do you understand by occupational judgment? occupational intelligence?
- 19—List the independent and the common operations carried forward in your department and grade each according to the amount of occupational intelligence required, giving them percentage markings.
- 20—List twenty production proverbs to be found in this topic. Which one do you believe to be most important to your department?

Topic No. 15

SAFETY FIRST

Safety first programs are dependent for their success upon the fixing of responsibility for accidents.

All accidents should be divided into two principal groups:

1—Avoidable Accidents

2—Unavoidable Accidents

Accidents differ with regard to avoidability and unavoidability according to the location of responsibility.

From the standpoint of the person who knows, and can use a means of prevention, the accident may be said to be avoidable. From the standpoint of a person who may not know how, or who is powerless to prevent the accident, it may be said to be unavoidable.

The alert foreman will understand that unavoidable accidents may be transferred to the avoidable group whenever the responsibility can be fixed.

An example of an unavoidable accident which should be transferred to the avoidable class would be one resulting from the bursting of a grinder wheel operated at too high speed. It may be assumed that the accident is unavoidable from the standpoint of the worker, he being powerless to control the conditions. The same accident may be considered avoidable from the standpoint of the person responsible for the fixing of speeds of the particular grinder.

It becomes the duty of persons interested in safety first administration to fix responsibility wherever possible and thereby reduce the number of so-called unavoidable accidents.

The first step in any constructive safety first program is the fixing of responsibility for prevention of those accidents which have been considered unavoidable and which may be classed as avoidable through fixing of responsibility.

The responsibility for accident prevention having been fixed,

the next step in safety first procedure is to determine the specific causes leading to accidents.

The final step is the adoption of a program looking toward the removal of the causes of avoidable accidents whenever possible, and the inauguration of policies intended to reduce the possibility of injury from unavoidable accidents.

AVOIDABLE ACCIDENTS

Avoidable accidents may be classified as follows:

1—Avoidable accidents due to carelessness

2—Avoidable accidents not due to carelessness.

Carelessness within the meaning of this topic is to be understood to be that attitude of mind which is a result of a lack of appreciation of the rights and interest of self or of others.

Avoidable Accidents Due to Carelessness

It is assumed that the careless worker or foreman has been informed of dangers and is aware of the possibility of an accident due to his inattention to certain details.

An instance of carelessness which may result in an accident would be the failure to place a guard on a grinder. It may be assumed that all mature workmen, as well as foremen and managers, understand the importance of placing guards on grinders. It is a matter of common knowledge, however, that many grinder wheels remain unguarded.

A common remark heard following an accident is, "I knew better," or "He knew better." It is a human characteristic to be neglectful.

Foremen and workers who neglect to safeguard themselves and others against a recognized danger, constitute a constant menace to business growth.

In spite of the fact that people generally protest against carelessness, and that foremen and workers everywhere are unanimously of an opinion that carelessness is inexcusable, the fact remains that

thousands of accidents occur daily as a result of carelessness. Carelessness may result in avoidable accident because of:

- 1—Underestimation of dangers
- 2—Unconcern for surroundings.

Underestimation of danger is a result of a lack of understanding of the seriousness of the hazard and is not to be confused with ignorance. It is assumed that the one who is guilty of carelessness does understand that danger exists. Lack of understanding of the seriousness should be understood to mean that the person recognizes the danger but minimizes the importance of exercising caution.

The only treatment for persons afflicted with underestimation of danger, is instruction in relative risks.

Workers should understand that the final result of an accident does not always depend upon the seriousness of the injury.

Workers often neglect to give proper attention to a "mere scratch," and thereby help to increase the business of the artificial limb factories.

The experienced foreman knows that any injury may become a serious injury.

The famous remark of the revolutionary General Wayne, that "The only good Indian is a dead Indian," should be changed for safety first purposes to read, "The only safe danger is the danger against which every one is fully prepared."

The only safe foreman is the foreman who knows and guards his workers against every danger.

It is not enough to be careful in the face of a great danger, the safety first foreman must avoid the very appearance of accident. The only risk worth running is that risk which cannot be avoided. To court a danger because it is slight is as surely an evidence of weakness as to run away from great danger.

Evidence of carelessness because of underestimation of dangers should be positive proof to the foreman of the need for safety first instruction.

The foreman who ignores evidence of carelessness due to under-

estimation of danger is neglecting his duty toward both the worker and the management.

Production which is increased by underrating dangers is production gained through false pretenses. Foremen should never allow an unnecessary risk, however slight, to pass unnoticed. The only way to avoid the big accidents is to begin early to avoid the little ones. It is much better for the worker to be called a "mollycoddle" because he is sensible than to be called a hero for acting foolishly.

The husband or father who "flirts with the undertaker" should not blame others for thinking he is unhappy at home.

Unconcern for surroundings is a manifestation of carelessness which may carry with it a multiple loss. If the worker is forgetful of others during his performance of an operation he may injure or be injured by those he has forgotten.

This kind of carelessness is frequently a characteristic of the energetic, willing worker. Because of this fact, it is of all the more importance that the worker should be saved from his own absent-mindedness.

The workman must watch the track ahead for obstructions and open switches while driving his engine down the main line of production.

The amateur hunter who made farming unsafe in the hunting season is responsible for most of the "No hunting allowed" signs.

The term "bone head" was first applied to a major league ball player who earned the title by overlooking a "play" while watching his base. The industrial "bone head" is the person who sticks so close to his job that he hinders production by forgetting his fellow workmen. The industrial "jay walker" is as great a menace to production as the "jay driver" is to traffic.

The foreman must add to his other qualifications that of the traffic officer on a busy street. It is one of the duties of a foreman to keep the jobs going and to see that traffic is not jammed. Care should be observed not to overdo the management of "job traffic." Some traffic officers are harmful because, in their efforts to avoid collisions they bring about congestion.

The worker should be trained to give just the right amount of attention to his job. Too much attention to jobs other than his own will slow up production and accomplish no good end.

Avoidable Accident Not Due to Carelessness

Avoidable accidents not due to carelessness within the meaning of this topic may be said to include all those which are the result of ignorance of hazard. An instance of an avoidable accident not due to carelessness, would be the result of an attempt to drive a truck on the wrong side of a busy city street. If the driver's failure to observe the traffic rules was due to ignorance of the regulations, the accident would be said to be an avoidable accident not due to carelessness. The driver would be a fit candidate for instructions in auto driving.

In support of organization and education for safety first, the following interesting table is taken from the book, "Liability and Compensation Insurance," by Ralph H. Blanchard. The figures were supplied by Robert J. Young, manager of the department of safety and relief of the Illinois Steel Company. The figures indicate the relative percentage of efficiency of various methods adopted by that company in their safety first campaign during which accidents rates were reduced 85%.

ORGANIZATION

1—Attitude and personal work of those in authority	30%
2—Safety committees	20%
3—Inspections (not by committees)	5%
	<hr/>
	55%

EDUCATION

4—Instruction to employees	12%
5—Bonuses, prizes, etc.	8%
6—Talks by superintendents, foremen and others . .	3%
7—Signs	2%
	<hr/>
	25%

SAFEGUARDING

8—Safety devices.....	12%
9—Lighting devices.....	5%
10—Cleanliness and order.....	3%
	<hr/>
	20%

In summing up the various items presented by Mr. Young it is found that organization and education were credited with being responsible for 80% of the reduction in accident rates.

The foreman who seeks to shift the burden of his responsibility to the mechanical safeguard can readily understand how ineffective will be his safety first administration. Safeguards have their place and are a vital necessity but it should be remembered that it is impossible to make machinery "foolproof." Another interesting deduction from the above table is that *talking* safety first may be expected to accomplish merely 3% of possible accident prevention. The following excerpt from Bulletin No. 47, Industrial Accidents and their Prevention, Federal Board for Vocational Education, is proof of the value of training in being careful. "One of the most important considerations of industrial management is the induction of the new employee into the plant. In *all industries* the new men, 'green men,' are most frequently injured. In a large steel plant the accident records revealed that men employed less than 30 days were injured six times as frequently as those employed longer, and that those employed less than six months were injured four times as frequently as the remainder. These accidents are not so much due to foolhardiness or carelessness as to ignorance of the hazards and of the proper way to do the work and hesitancy in asking instruction. The greater the labor turnover the more important it is that the new employee receive the proper instruction in his work. Each new employee is a potential hazard and as he is increased in number, the hazards and possibilities of accidental injuries increase proportionally."

UNAVOIDABLE ACCIDENTS

When accidents have been reclassified according to the responsibility for prevention, there will be found to remain many which must be classed as unavoidable.

Unavoidable accidents may be safely assumed to be largely due to the hazard of industry.

Some accidents occur for which a cause can not be assigned. The mere fact that the cause of an accident can not be fixed is no excuse for failure to protect workers against a known danger.

As a means toward fixing responsibility for prevention and toward determination of causes of accidents, two methods of procedure should be followed:

- 1—A study of the influences contributing to accidents
- 2—A research department in every factory to determine scientifically all possible causes of accidents.

In order to enable the foreman to make a beginning in the study of contributing influences, the following figures are offered for comparative purposes from the Report on Iron and Steel Industry, Vol. IV, pp. 174-5, in which an attempt is made to record the causes of accidents. The following five causes together with their relative percentages of influences upon accident frequency make an interesting study:

1—Hazard of industry.....	60%
2—Negligence of worker.....	7%
3—Negligence of fellow worker.....	6%
4—Negligence of employer.....	4%
5—Not disclosed by the record.....	23%

The mere statement that 60% of the accidents in a plant may be classified as due to hazard of industry is not to be taken to mean that these 60% are unavoidable. Certainly some are unavoidable but that organization and education which offers reasonable assurance of a reduction of 80% of accidents will be more effective if it is accompanied by a scientific study of the causes of accidents.

While the establishment of such a safety first laboratory offers great opportunity, it is a matter in which the management rather than the foreman must be interested. This topic treats of the subject from the standpoint of the foreman and will therefore be confined to the influences contributing to accidents. In concluding the discussion of unavoidable accidents it may be said that accidents due to negligence of workers, negligence of fellow workers, negligence of employer as well as those due to uncertain causes, may be safely assumed to be material for organization and education work in safety first.

Accident Frequency Points

Certain facts bearing upon the frequency of accidents and their prevention may serve as a guide to foremen and managers in the study of causes of accidents. It is easier to fix the responsibility for prevention and determine the cause when comparative frequency records are studied. Figures gathered in 1914 by the Massachusetts Industrial Accident Board reveal the following facts:

- 1—The largest number of accidents occurred between 10 and 11 A. M. and 3 and 4 P. M.
- 2—The largest number of accidents occurred to workers earning from \$11.00 to \$12.00 a week.
- 3—The largest number of non-fatal accidents were sustained by workers from 21 to 29 years of age.
- 4—The greatest number of fatalities were sustained by workers from 40 to 49 years of age.
- 5—The average duration of disability was 12.48 days.

To these five frequency points may be added the following:

- 6—Thirty day workers are injured six times as frequently as experienced employees.
- 7—Workers employed less than six months are injured four times as frequently as other employees.

The following information on accident frequency for foreign born and for night workers is taken from Bulletin No. 256, *Accidents and Accident Prevention in Machine Building*, by U. S. Department of Labor, Bureau of Labor Statistics:

Inability to Speak English as Related to Accidents

“In the first report of the Bureau on accidents in the iron and steel industry a careful study was presented of the comparative accident rates of English speaking and non-English speaking workers, the basis of the comparison being the experience of a large steel plant over a period of years. The result of that study shows that while the accident rates were reduced for non-English speaking steel workers as well as those speaking English, the improvement in the case of the non-English speaking workers was much less definite and much less steady.

“It is not to be concluded from this fact that the evident handicap upon the non-English speaking employees is entirely due to their inability to understand directions and orders. This is unquestionably a factor in their less favorable accident rate. But another factor also enters, namely, that the non-English speaking workers, as a rule, suffer from lack of experience and thus are found largely in the group of unskilled occupations involving inherently high accident hazards.

“For the machine-building industry it was not possible to obtain such full information as to the effects of inability to speak English upon accident rates as was obtainable for the steel industry. Of much interest, however, as bearing upon the same subject, is the following table, which compares the accident rates of the American born worker and the foreign-born worker in a large machine-building plant:

“Frequency and severity of accidents among American and foreign-born workers in a machine-building plant during the period 1910 to 1913:

RACE GROUP	Number of 300 Day Workers	NUMBER OF CASES			
		Death	Permanent Injury	Temporary Disability	Total
American born . . .	22,556	11	35	1,320	1,366
Foreign born	18,039	16	82	1,737	1,835
TOTAL	40,595	27	117	3,057	3,201

RACE GROUP	Number of 300 Day Workers	ACCIDENT FREQUENCY RATES (Per 1,000 300 Day Workers)			
		Death	Permanent Injury	Temporary Disability	Total
American born . . .	22,556	0.5	1.6	58.5	60.6
Foreign born	18,039	.9	4.6	96.3	101.8
TOTAL	40,595	.7	2.9	75.3	78.9

RACE GROUP	Number of 300 Day Workers	ACCIDENT SEVERITY RATES (Days Lost per 300 Day Worker)			
		Death	Permanent Injury	Temporary Disability	Total
American born . . .	22,556	2.9	0.9	0.5	4.3
Foreign born	18,039	5.3	3.4	.9	9.6
TOTAL	40,595	4.0	2.1	.7	6.8

“The foreign-born are not entirely non-English speaking, but the constant excess of the accident rates of the foreign-born, as shown in the table, may clearly be attributed to causes similar to those affecting the accident rates of the non-English speaking workers in the steel industry, referred to above.

* * * * *

Day and Night Accident Rates

“The question of accident distribution through the hours of the day has been illustrated elsewhere by so many and such extensive compilations that no special study of it need be made here. Attention will be chiefly confined to the allied question of day and night accident distribution, as illustrated by such limited data as could be obtained from the machine-building plants covered.

“The following table shows, by hours of the day and night, the distribution of 6,075 accidents in a large machine-building plant in 1913. This number is chiefly composed of non-disabling accidents, for which class of accidents full reports were available in this plant. For the purpose of studying distribution of accidents those of a non-disabling character are just as useful as those causing disability.

“Distribution through the day and night of disabling and non-disabling injuries in a machine-building plant, 1913:

HOUR ENDING AT—	NON-DISABLING INJURIES		DISABLING INJURIES	
	Day	Night	Day	Night
7.....	31	43	9	19
8.....	362	53	87	20
9.....	499	44	102	19
10.....	628	52	159	16
11.....	574	42	119	10
12.....	396	25	98	8
1.....	263	14	41	1
2.....	463	46	84	4
3.....	510	36	107	6
4.....	429	32	93	3
5.....	290	22	72	5
6.....	80	27	29	3
TOTAL.....	4,525	436	1,000	114

“As regards the hourly distribution of accidents shown in the table, it is sufficient to note that it conforms entirely to the general type of the compilations hitherto made.

“There are two peaks of accident occurrence, one in each half of the working period, with the peak tending to come earlier in the second half.

“For the purpose of accurate comparison of day and night accidents, the data given in the preceding table are presented in the next table in the form of day and night frequency rates.

“Comparison of day and night accident rates in a machine-building plant, 1913:

CLASS OF ACCIDENT	NUMBER OF 300-DAY WORKERS		CASES OF INJURY		FREQUENCY RATES (Cases per 1,000 300-Day Workers)	
	Day	Night	Day	Night	Day	Night
Non-disabling . . . . .	.....	.....	4,525	436	338.73	494.89
Disabling . . . . .	.....	.....	1,000	114	74.86	129.40
TOTAL	13,359	881	5,525	550	413.59	624.29

“The excess in night frequency rates is very marked for both non-disabling and disabling accidents. Combining both classes of accidents, the frequency rate appears as 413.59 cases for day workers as against 624.29 cases for night workers. The night rate is thus almost exactly 50 percent higher than the day rate.”

Foremen should apply these frequency points to the workers and the jobs in their departments.

Job specification records called for in topic No. 9 should take these points into consideration.

The following data were furnished by the Safety Institute of America and should be evidence to foremen and managers everywhere of the opportunity for service through safety first practice. It is a record of the reduction in accident frequency.

American Shipbuilding Co., Lorian, Ohio—May-Dec. 31, 1919 62%
 American Steel & Wire Co., New Haven, Conn.—Works, 1919 75.3%
 Central Tube Co., Ambridge, Pa.—Jan.-July, 1920. 80%
 Eastman Kodak Co., Rochester, N. Y.—Jan.-July, 1920. . . . 30%
 Ford Motor Co., Detroit, Mich.—Oct., 1916-May, 1918. 80%
 Kimberly-Clark Co., Niagara, Wis.—July-Dec. 31, 1919. . . . 73%
 Mare Island (California) Navy Yard—July, '17-Dec. 31, 1919 80%
 Maxwell Motor Co., Detroit, Mich.—Mar., 1918-Mar., 1919 88%
 Mershon, Eddy, Parker Co., Saginaw, Mich.—1919. 60%
 Raritan Copper Works, Perth Amboy, N. J.—1919. 65%
 Solvay Process Co., Detroit, Mich.—1919. 62%
 United Alloy Steel Corp., Canton, Ohio—Aug.-Dec. 31, 1919 . 67%

TOPICAL QUESTIONS

- 1—List the probable accidents in your department. Designate which ones are unavoidable, avoidable.
- 2—Give an instance of a probable accident which is now classified as unavoidable and which in your opinion should be considered avoidable. Why should it be reclassified?
- 3—List the probable avoidable accidents in your department which in your opinion are not due to carelessness. Why do you so consider them?
- 4—List the probable accidents in your department which in your opinion are due to carelessness. Why do you think they are due to carelessness?
- 5—Select any accident which has occurred in your department and indicate the probable cause.
- 6—Give an instance of an accident due to underestimation of dangers, unconcern for surroundings.
- 7—How would you go about it to correct underestimation of dangers, unconcern for surroundings?
- 8—How may underestimation of dangers increase labor turnover? Give an instance.
- 9—Give an instance of industrial “jay walking” which you have observed in your department.
- 10—Give instances wherein each of the ten methods listed under organization, education and safeguarding might be used in your department.
- 11—Why do talks on safety first seem to accomplish little in comparison with the other nine methods suggested?
- 12—What is done in your department to reduce the hazard of the “green” worker?
- 13—How would you go about it to reduce the accident record in your department? Give instance under each of the ten methods.
- 14—List the probable unavoidable accidents which may occur in your department. Give a possible cause of each accident.

- 15—List all the influences which in your opinion may contribute to accident.
- 16—Which of the accidents listed under question 14, do you believe to be due to hazard of industry, negligence of worker, negligence of fellow worker, negligence of employer?
- 17—Give an instance of an accident which occurred in your plant the cause of which is unknown.
- 18—List the probable accidents in your department for which a cause might not be assigned.
- 19—Select an accident which has occurred in your plant, the cause of which has not been discovered and endeavor to assign the cause.
- 20—List each job in your department in its order according to the danger of accident. What are the dangers?
- 21—If you were in charge of a particularly hazardous job, what times of the day would you be most careful?
- 22—List the safety devices in use in your department. What jobs are they used on? How could they be improved?
- 23—List the lighting devices which contribute to safety of the employees. How could they be improved?
- 24—What provisions for cleanliness and order are carried forward in your department as a part of a safety first plan? How could they be improved?
- 25—Select one job in your department and prepare a job specification record taking each of the accident frequency points into consideration.
- 26—Apply the accident frequency points to each job in your department. Make the entry as a part of the job specification record.

Topic No. 16

PURPOSES AND AIMS OF FOREMAN TRAINING

Modern development of machinery has brought with it demands upon the managements of industrial concerns which the industrial pioneer did not encounter. Within the lifetime of men yet active, the owners of many businesses have been forced from the shop to the office. The manufacturer today is kept busy getting orders, or deciding which order to fill, or obtaining materials. The manager is kept busy with details of the business which have grown up as a result of complications of modern social and political life. The owner who toiled beside his workers, filed the orders on a bill hook and made change from his pocket, has vanished with the prairie schooner. The employer of today has been compelled to drop the tools of his trade to guide the ship of his business through the crowded channel of modern competition. When the modern factory head is not busy getting materials or orders, he is meeting inspectors or testifying before commissions.

There is increasing need for a representative group in the factory which will truly reflect the management to the workers and the workers to the management at a time when modern business methods demand that the managements give exclusive attention to office detail.

The need for training in factory management is becoming imperative with each new development in modern business. During that period in industry when this country began to change from an agricultural to a manufacturing nation, industrial pioneers were respected after the manner of all other pioneers. A grateful public sang their praises and offered encouragement in the midst of difficulties. Once established, the industry soon found itself hedged about by influences which sought to control and direct the business. States and municipalities which once offered every inducement to railroads and corporations to locate within their respective juris-

dictions now spend thousands of dollars annually investigating conditions and assisting in the direction of the businesses.

The industrial pioneer was the recipient of many offers of assistance and the communities contested for his favor. The manufacturer of today engages a legal department to interpret the laws enacted to control his business and communities contest for his possessions. In the midst of this changed condition of affairs managements everywhere have come to realize the necessity for having a group within the factory or plant who can be relied upon at all times to represent the owner accurately before the workers and as accurately represent the true spirit of the workers before the management.

Systematic arrangement of business affairs is as necessary to modern industry as are the traffic rules to city travel. Analysis was carried into business when the pugilistic owner was carried out. Analysis is necessary if system is to prevail. Lack of system being generally due to failure to analyze, it naturally follows that the first test of a manager should be his ability to analyze. Trying to conduct business without analyzing its elements may be compared to guessing the sum of a column of figures without seeing each separate figure. Occupational analysis has a place in foreman training wherever the management desires to establish system in production.

Three elements considered in foreman analysis are, materials, operations and processes, and workers. Materials must be studied and classified apart from other elements if a systematic plan for production is adopted. Operations and processes are the means by which materials are transformed into a marketable product and as such may excellerate or retard production according to their efficiency. Operations, like people, differ with regard to their ability to be advanced.

Children who can not be advanced are said to be subnormal. Those who advance more quickly than usual, are said to be precocious. Operations and processes should be studied as children, to

discover which ones offer greatest opportunity for advancement. The foreman or superintendent who does not classify his operations and processes according to opportunity for improvement makes a public confession of his lack of system.

The industrial cave man confined his foremanizing to supervision of materials, operations and processes. The up to date foreman does more supervising in two hours than his predecessor did in ten. The foreman of today does not devote more than one-fifth of his time to supervision, because four-fifths of his time must be devoted to promotion. The amount of time which must be devoted to promotion is greater or less according to the skill and cooperation of the workers on the job. All other things being equal the firm which has the largest measure of skill and cooperation among its workers will control the situation. Presence of skill and cooperation among workers is like a bank account for a rainy day, it leaves the manager free to attack his problems without looking backward over his shoulder. If workers do not possess sufficient skill they must be instructed and trained. Instruction and training of workers should naturally follow where skill and cooperation are not of the best. "Competition is the life of trade," if a firm can not compete it is "playing hookey" from the industrial graveyard.

The foreman who declines to take an interest in the workers of his department is slamming the door in the face of opportunity. The foreman's greatest study is his working men. It is not enough for the foreman to know how workers work, he must know how they live and think. "A little knowledge is a dangerous thing." Industrially speaking, the less a worker knows the more dangerous he is. An ancient Hebrew warrior dismissed thousands of soldiers and went into the conflict with a few hundred loyal, well trained men and won. The industrial manager who can rely upon a group of loyal and well trained foremen will be ready to meet almost any emergency. The foreman whose workers have ambition, job pride and self-respect can be relied upon to "deliver the goods," all the time. As an effective means to the fostering of ambition,

job pride and self-respect, foreman interest in workers is beyond question.

"A friend in need is a friend indeed," should remind the foreman of the opportunity in first aid. The story of the Good Samaritan was the first account of first aid administration on record. That story is still new after two thousand years. The foreman need not fear that the practice of first aid will grow tiresome. The first man in history who made a business of "passing the buck" was the one who passed by the injured man just before the Good Samaritan appeared with his first aid kit. The Levite failed to shift the responsibility, in the story, and the foreman would do well not to try "passing the buck." The foreman should reflect too, that the injured man in the story had held a real grudge against all Samaritans. After first aid had been administered, he remembered the Samaritan as his friend. The first aid kit contains a magic remedy by which hatreds are changed to friendships and opposition to loyalty.

Care of equipment is as necessary to modern industry as first aid is to the worker. Care of equipment in lubrication, cleaning, painting, adjustments and repairs is in reality first aid administration to industry. Every rattle in the machine is a danger signal to the management. Every shut down is a loss. A story records that, for the want of a nail, a horseshoe was lost; for the want of a horseshoe, a horse was lost; for the want of a horse, a battle was lost; for the want of a victory, a kingdom was lost. A modern parallel might read, for the want of lubrications (cleaning, painting, adjustment or repairs) a machine was shut down, for the want of a machine the orders were lost, for the want of orders the plant was closed down.

When pressure of new influences forces the owner from the shop to the office he recognizes the need for reports. In order to furnish reliable reports, accurate records are necessary.

Just as modern industry depends upon accurate reporting so does foreman training depend upon recording as a basis for instruction. The foreman who is being trained will be benefitted in proportion to the completeness of his recording. Every list requested and every record suggested should be prepared if the foreman and the

management expect to get results. All industrial improvements are results of recorded study and labor. Successful foreman training is no exception to the rule.

The foremen, who at the conclusion of a course of training have started complete sets of records from which reports can be made, will be the ones whose departments will show improvement from the instruction. Records or reports called for in training courses need not be prepared if the details are already provided for in forms issued by the company. The company forms should be substituted for the ones requested in the topic. The test of the foreman's understanding of the subject matter of the topics will be the manner in which he keeps his records and renders his reports.

Success of direct supervision of operations and processes depends upon the interest of the supervisor. Every successful enterprise was founded and supervised during its infancy by some man who was "married to the business." Prudent men are always married twice: first, to the business, then to the wife. Being wedded to a woman and a job is approved by the law. It is the only kind of bigamy one may commit and keep out of jail. There is a common understanding between the workers and the owner who works on the job. Understanding is a result of experience. Faith is a result of understanding. The ideal indirect supervision is the kind which maintains a common understanding between the owner and the workers on the job.

Company policies are the means by which the management endeavors to strengthen the workers' understanding. The foreman, as an interpreter of company policies, must study each policy in order to interpret it understandingly.

Turnover, to the industrial pioneer, meant just two things, money and material. Labor turnover came with improved machinery and complication of business. The withdrawal of the old human touch of the owner who worked on the job, resulted in decreased interest and increased labor turnover. The foreman must be brought to understand the need of human interest on the job.

Cooperation with the management, with other foremen or with workers is impossible if the foreman confines his interest to the machine-like operations of production. Cooperation without understanding is artificial and cannot last. To expect permanent cooperation between human beings without close study of the influences affecting persons from whom cooperation is expected is like expecting a crop of good wheat while ignorant of the kind of seed. Ignorance, prejudice and conflict are characteristics of persons engaged in poorly managed businesses—knowledge, reason and cooperation mark the progress of all sound enterprises.

The road to industrial cooperation is paved with something more than good intentions. It is paved with understanding service. The person who makes a regular business of cooperation will soon increase his business. Industrial cooperation is the sunlight which gladdens the hearts of indifferent managers and workers and makes production grow.

Real cooperation is impossible without a close study of the outside influences affecting those with whom cooperation is desired. Without a knowledge of the social influences acting upon workers, the foreman is like a general who goes into battle ignorant of the condition of his troops.

Nearly every one does two things, the thing he is paid to do and the thing he loves to do. The constant struggle of each person is to make the thing he loves to do, the thing he is paid to do. When a person finds a job he loves to do, he is soon known as successful. If a foreman would learn the occupational tendencies of the workers of his department, he should observe their use of their surplus time.

The industrial pioneer laid the foundation of his success by careful selection of his workers. The foreman must frequently choose between the lesser of two evils in the selection of workers. Employment of workers on jobs for which they are not adapted increases the need for supervision, management and training.

Any system of instruction which merely aims at increasing production, neglects the most important feature of human development. Men and women may not be improved by increasing produc-

tion, but production will be increased by improving men and women. The first duty of the industrial management should be to interest itself in its workers. The natural result of wise managerial interest in employees is increased production, improved cooperation, and lowered labor turnover. Foreman training should result in a mutual understanding of the problems of the management and the workers. The efficient foreman will be interested in the welfare of each one of his workers. The foreman who does not have a working knowledge of the standards of living of the workers of his department will be as rare within the next generation as the belligerent "boss" is now.

Next to the foreman's knowing all about workers, is his need for being acquainted with each operation and process. Knowledge is the cement used in building processes. The strength of the cement depends upon the mixture. Technical knowledge is the sand, empirical information the water and auxiliary knowledge the cement which forms the concrete structure of every operation. The amount of each element used in each job will differ according to the nature of the operation entering into it.

Invention has ceased to be a mysterious art since large corporations have set up laboratories for the improvement of equipment. Improvement of human beings is brought about by careful planning. Why should not equipment improvement submit to the same laws of progression? In the promotion of operations and processes an avenue is opened to the intelligent foreman through which he may advance with certainty of ultimate success.

Industrial paralysis in a business is a direct result of failure on the part of the foreman to exercise each of the important functions of foremanizing. Two principal opponents encountered by those who are interested in foreman training are the foreman who thinks there is not much to know about foremanizing and the foreman who imagines he knows it all. Before one can be taught he must realize his need for instruction. Until managers and foremen realize that they apply the principles of psychology, more often than do college professors, industrial unrest will continue to manifest itself. When the foreman has realized his need for instruction he has taken the

first step on the ladder of industrial success. Interesting the foreman in foreman training depends upon his being convinced of his need for instruction. "A man may be led to knowledge but can not be made to think," likewise one must be hungry for ideas before he is ready to partake of instruction.

Safety first organization offers great opportunity as a means of awakening the interest of the foreman in his need for training. Safety first organization and education appeal to every one who is at all interested in industrial development. Every function in the art of foremanizing is exercised in safety first administration. The need for instruction of workers and apprentices, maintenance of order, the use of orders, directions and suggestions, enforcement of company policies, promotion of interest, first aid, care of equipment, recording and reporting, labor turnover, ordering, storing, developing and delivery of materials, cooperation, outside influences, supervision and promotion of operations and processes all are embraced within the organization and administration of a safety first program. If safety first organization has not been begun in a plant it should be inaugurated simultaneously with foreman training. Where a safety first committee is functioning, that committee offers a vehicle for the inspiration and introduction of foreman training.

Our country's growth and development depends upon the growth and development of its citizens. The stability of a building does not depend upon the strength of its strongest pillar. A wall is as strong as its weakest brick. Nations, communities, and organizations are not judged by their most able representatives. Some thing must be done in every community, to reestablish that skill and job pride which is rapidly disappearing. A common mistake is to place the blame for loss of skill and of job pride upon individuals or organizations.

Lowering of the standards of industrial personnel is resulting from the slow process of adaptation to new conditions of production.

The changes from domestic to factory production methods were radical. Business managements are naturally conservative in dealing with unknown quantities and conservatism has been practiced in

adaptation of human beings to new industrial situations. Machines have been installed over night. Generations are sometimes required for managers and workers to adjust their human relations to the changed production methods. The great majority of human beings quite naturally follow the line of least resistance.

The great problem of the human engineer is to render correct practices easier to do than to dodge. Human engineering should become a part of our production practices. Systems of production must be fitted equally well to different systems of society.

Kings may be dethroned and governments may be changed, but production will go on forever. This generation owes it to the men and women of the future to improve methods of production.

The only real excuse for man's having lived is to leave the world better at the close of life than he found it at the beginning. Workers and managements have a common obligation to the coming generation. The real conservative is the one who fails to recognize service to mankind in progressive action. To argue about whether or not production shall be carried forward is like arguing about the laws of gravitation. There is only one side to the subject. Production must go forward. As production goes forward, so must men and women advance. The world will be benefited by any system of instruction worthy of being made the subject of training in the modern factory.

TOPICAL QUESTIONS

- 1—Why is it as important to reflect the worker to the management, as it is to reflect the management to the worker?
- 2—Write a short history of your own business.
- 3—Give three reasons for a foreman making analyses.
- 4—Why is it that the average mechanic seems to be less skilled than the mechanics of the past generation?
- 5—Why should the foreman receive instruction in the art of teaching?
- 6—Why is the foreman's greatest study his working men?
- 7—Why should a foreman know how his workers live?

- 8—Why is a “little knowledge a dangerous thing” from a production standpoint?
- 9—What do you understand by loyalty?
- 10—What do you understand by the statement that “The first aid kit contains a magic remedy by which hatreds are changed into friendships and opposition into loyalty?”
- 11—What do you estimate to be the loss from shutting down a regularly operated equipment in your department, during one hour?
- 12—List each piece of equipment in your department, together with the hourly loss in case of shut down.
- 13—What do you believe to be the best reason for recording? for reporting?
- 14—Complete all records and reports requested in Topic No. 9.
- 15—Why are company policies necessary? Why should foremen understand their application?
- 16—What do you understand by “labor turnover?”
- 17—Why should the foreman interest himself in the extent of labor turnover?
- 18—What do you understand by cooperation? How may the foreman cooperate with his workers?
- 19—How may the foreman cooperate with the managers?
- 20—Why should a foreman be interested in outside influences? Give an instance of how your department may be benefited by your interest in outside influences.
- 21—Why should foreman training result in a mutual understanding of the problems of the management and the worker?
- 22—State three reasons why a foreman should be acquainted with each operation and each process.
- 23—What is technical knowledge? Auxiliary knowledge? Empirical information? What is a manipulation?
- 24—Why should a foreman be proficient in all the factors of the modified Richard’s formula?

- 25—Why should a foreman plan improvements for his department?
- 26—What do you understand by the statement, “Managers and foreman apply the principles of psychology more often than do college professors?”
- 27—Why does a safety first organization exercise every function of foremanizing?
- 28—How will foreman training raise the standards of skill and increase job pride?
- 29—What do you understand to be the business of a human engineer?
- 30—What is the foreman’s duty, as a foreman, to the next generation?
- 31—Offer ten suggestions for the introduction and improvement of foreman training.

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